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The Presidential Address*

BRITISH AND CANADIAN MEDICAL ASSOCIATIONS, 1930

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I AM profoundly appreciative of the signal honour that has come to me through my election to the office of President of the British Medical Association, in succession to a long line of distinguished predecessors. In offering my grateful acknowledgments to my professional confrères for their good will and to the councils of the Canadian and the British Medical Associations for their approval, I desire to express my earnest hope that this meeting in Canada will serve to strengthen between this Dominion, the Mother Country, and the various other units of the Empire, the ties of scientific fellowship, fraternal good will, and patriotic unity.

We Canadians welcome with all our hearts the visitors from the Mother Country with whom we have the honour of being associated in this meeting. We welcome you because you are of the family. We know that you have felt, from the moment you first set foot in Canada, that you are on soil which is yours as well as ours, that you are under the folds of the flag which is yours and ours, that you are welcome visitors from the old homestead to a new land, where the children of the old stock hold the old faith and love the old traditions, and cherish a pride in the inheritance of British institutions and ideals. You feel with us, we are sure, the sense of possession of this spacious Dominion which we, with our fellow-Canadians of French extraction and those of other racial strains who are combined with us in the Canadian national unity, hold under the providence of God for King and Empire.

This meeting in Canada of the British Medical Association, in acceptance of an invitation from Winnipeg, first given thirty-three years ago, is regarded by the medical profession of the Dominion as an outstanding event in its history, and is of special significance at this time when the bonds of Empire are growing stronger and there is increasing evidence that Canada shares with the Mother Country a common outlook and a common destiny.

We greet with special pleasure our professional brethren who are with us from non-British countries. To those who come from south of the international line, we desire to make heartfelt acknowledgment of the friendliness invariably shown to Canadian physicians who visit their country. The mutual understanding and cordiality between us manifests itself in the freedom with which we cross the border from one country into the other. Canada, in growing strong and prosperous and confident, has become increasingly capable of fulfilling the great duty of interpreting the British Empire to the United States and, by being the bridge of understanding between the two, serves to maintain and strengthen the friendship and co-operation between the two great branches of the English-speaking family on which depend the future progress and welfare of the world. We, as British subjects, know, and our cousins across

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the line who are the heirs of British traditions, know likewise, that wherever the British flag has been carried freedom has ripened under its influence, law and order have been maintained, and the common lot of the common man has been made happier. We are workers with a common purpose for the betterment and progress of mankind. We say, as Abraham said to Lot: "Let there be no strife, I pray thee, between me and thee, and between my herdsmen and thy herdsmen, for we be brethren".

It is interesting to recall that only twice before has the British Medical Association met outside of the British Isles, and both times the meeting was in Canada—in Montreal in 1897, under the presidency of the late Sir Thomas Roddick, and in Toronto in 1906, when the late Dr. R. A. Reeve was the presiding officer. We who had the privilege of being present on these occasions will ever treasure the memory of meeting in the flesh the great men of British Medicine of that period, Lister, Osler, Clifford Allbutt, and many others. What Canadian physician who attended that memorable meeting in 1897 can ever forget the occasion when Osler delivered his classical address on "British Medicine in Greater Britain". In looking forward to the great developments which the future would bring he said: "Under new and previously unknown conditions the Africander, the Australian, or the New Zealander, may reach a development before which even 'the glory which was Greece' may pale." And he added: "Visionary as this may appear, it is not one whit more improbable than would have been a prophecy made in 1797 that such a gathering as the present would be possible within a century on the banks of the St. Lawrence." To those words of Osler, we may well add now: Nor would it be more visionary than would have been a prophecy made in the 1860's, before the Red became a Canadian River, and when Western Canada was a wilderness, that such a gathering as the present would be possible here on the banks of the Red in 1930.

We have still with us in Winnipeg several residents who are survivors from the era before Manitoba entered the Canadian family of Confederation, sixty years ago, as the fifth of the nine Provinces of the Dominion of to-day. They remember when there was still to be seen, crossing the area now within the city, an old trail along which, before the coming of the Selkirk settlers, the buffalo used to travel in Indian file to a drinking place on the bank of the Red River. They remember the religious festival known as the White Dog Feast, for which the Indians used to assemble here every summer. That festival was held for the last time on Point Douglas, which is within the city of Winnipeg, in June 1873—only fifty-seven years ago. In performing the elaborate ceremonial at that festival, the medicine men officiated, but more as priests than as physicians. How different those medicine men from the medicine men assembled at this meeting in Winnipeg!

For many years it was the hope of leaders of the profession in Great Britain and in Canada that through the establishment of branches the British Medical Association would become firmly rooted in the Dominion, but local needs and ocean-wide separation foredoomed that hope to failure. Out of a total number of about 9,000 practitioners in Canada, only 374 became members of the British Medical Association. The bond of sentiment was strong between the professions in the two countries, but the bond of organization was weak. A happy arrangement was effected when, in the words of Dr. Cox—"A marriage between our two Associations, with the word 'obey' left out, was arranged." To speak more accurately, the Canadian Medical Association is proud to be affiliated with the British Medical Association, and to accept the relationship by that implied:

> "Daughter am I in my mother's house,
> But mistress in my own."

The records of Canadian medicine go back four hundred years to the times of the first French explorers, who discovered that the Indians had a knowledge of medicine and surgery equal in some respects to their own. "In no country", writes Heagerty, "is the history of medicine so well preserved as in Canada, in no country is the story so all-absorbing, so replete with striking incident." Among the ways in which the religious pioneers in Canada gave expression to the spirit of Christianity was the erection of hospitals, of which the first was the Hôtel-Dieu in Quebec, founded in 1639.

The surgeons during the French régime in Canada had, in the main, no degrees. They were of an inferior social status, practising

conjointly with barbers. Neither medical qualifications nor an apprenticeship were requisite as entitling an individual to practise. After the taking of Quebec, the British surgeons, who had come to Canada with the military and naval forces, and remained to practise their profession, flourished. That they were not lacking in a knowledge of the newer medical discoveries nor of the spirit of charity is attested by a notice in *The Quebec Gazette* in September, 1768, as follows:—

> "Mr. Latham, Surgeon to the King's Regiment of Foot, acquaints the inhabitants of Quebec that some days ago he inoculated some soldiers belonging to the Regiment, by which means he has secured sufficient infection for those who choose to be inoculated. All poor persons who are not able to pay and who are desirous of being inoculated may apply. He will attend and give them medicine gratis."

From the beginning of the British period, medical care was supplied for the most part by military surgeons who had retired from the service, or by surgeons who had been driven out from the revolted Colonies because of their refusal to give up their allegiance to the British Crown.

That Canada regards Great Britain as its fountain head in medical education has been exemplified by the holding of the primary examination of the Royal College of Surgeons of England in Toronto last summer. It is thus made possible for Canadians to acquire the coveted distinction of membership in the College without having to take the time to go to London for all the examinations. After years of negotiation, this privilege has been granted to our graduates. More and more, we may hope there will be recognition in Canada of the value of this hall-mark of academic standing.

One of the greatest privileges and pleasures enjoyed by Canadian physicians is to visit the Mother Country for recreation or scientific knowledge. The great historical shrines, the majestic ecclesiastical structures, "the urns containing the ashes of history", a thousand hallowed places in which the destiny of the English-speaking people has been decided, by conflict, conference, or educational process, draw the Canadian as with a lodestone. But if it should happen that he is a disciple of Æsculapius of limited means, anxious to blend study with pleasure and to profit by his sojourn in the heart of the Empire, in which the greatest clinical resources in the world may be found, he will agree with our confrères in New Zealand that these, to speak generally, have been neither well organized nor well advertised. Students complain of difficulty in securing the instruction desired and that courses have not been designed to meet their needs as in Vienna and in the United States. The Athlone report of 1921 sets forth the reasons why the post-graduate facilities in London have not been attractive to many students from overseas, which are — lack of funds, lack of a central hospital, and lack of a teaching staff having the interest, time, and determination to offer something as good or better than is obtainable elsewhere. The recent announcement that the Government of Great Britain, guided by the recommendations of the Post-Graduate Education Committee, had decided to make a grant of £250,000 towards the establishment of a British Post-Graduate Hospital and Medical School, (in co-operation with the London County Council, and with the University of London), was welcome news to the medical profession of Canada. It was likewise a source of satisfaction, I am sure, to the profession in all the other overseas dominions, who will greet with warm approval the statement of the Committee that it "Will offer to the post-graduate medical students of Great Britain, the Empire, and the world, both the best instruction and the most cordial welcome which a great centre for the teaching and the practice of medicine should provide".

The members of the medical profession, especially those who have been practitioners for a generation or more, are increasingly conscious of the radical changes that are taking place in the economic and professional system under which we live. Conditions of practice have been changed vitally, in method and in outlook, by the prodigious growth in medical knowledge, and the keener appreciation, both by the public and by our profession, of the right of citizens to good health and skilled medical care. A growing tendency is observed on every hand to demand collective organization of the community in the interests of the mass of the people, by common control or ownership of those agencies which minister to their need, their comfort or their happiness. In no instance has this been more

conspicuously displayed than in the field of medicine.

The economic basis upon which practice is being conducted has been the object of widely expressed dissatisfaction upon the part of both the profession and the public, and a multitude of agencies has been called into action to investigate and solve the intricacies of this most difficult problem. A prolific source of criticism and of dissatisfaction arises from the failure of our profession to provide competent service to the various sections of the community under a financial plan that will meet the needs of every class of citizen. The economic organization of medicine has not kept pace with its scientific progress.

The State, having granted the medical profession legal authority to control licensure and to pass upon the qualifications of men seeking authorization to practise, must unquestionably possess the right to exact a quality of professional skill and service that will meet the needs of the age, and to require adequate facilities for their distribution to every section of the community. If corporate medicine cannot or will not recognize and meet the demands so insistently made for the development of a system under which competent medical aid will be available—for rural districts especially—no protests can be raised if governments or municipal bodies take steps to inaugurate a system of medical service of whatever type and character may seem best.

I would not venture to pass upon the economic system of practice prevailing in other portions of the Empire, which have doubtless been evolved to meet situations there prevailing, but I may perhaps be permitted to refer to conditions that exist in Canada, from which lessons may be taught or conclusions drawn. At the outset let me say that I am strongly opposed to encroachment by the State on the field of private practice, and this attitude, I am sure, is supported by the large majority of my confrères. I do feel, however, that we must settle problems of service, cost, organization and distribution ourselves. I should be sorry if our inaction exposed us to the criticism that we possessed neither the vision nor the capacity to plan an organization of medicine no less advanced or scientifically applicable to the economic than to the scientific requirements of to-day.

One need not be endowed with unusual gifts of prophecy or of sapience to predict that, if we fail to interpret correctly the signs of the times and to realize the inexorability of the law of evolution as it relates to medical economics and practice, we shall find ourselves the victims of a system created by the political exigencies of the hour, the pressure of a public opinion that is intolerant of delay, and by a *laisser faire* attitude on the part of organized medicine. Thus, in the words of Sir Arthur Keith, shall we find ourselves "the slaves of circumstances rather than the masters of our fate", and dominated by "influence that arises outside and not inside the profession".

At no period in our history has medicine stood higher in public esteem and confidence than to-day, and never has our profession enjoyed a greater measure of good will and public support than at the present time. Admittedly, however, certain phases of practice are open to criticism, and the Æsculapian guild is confronted with many problems pressing for solution. These relate mainly to costs, unavailability of medical aid, and lack of qualification. The ground swell of dissatisfaction is felt especially in the west—in British Columbia, for example, where the medical profession frankly admits that State Medicine is impending and plans for dealing with the situation, when it arises, on a basis that will be satisfactory both to the patient and the public. The trend towards State Medicine at the coast is indicated by the report of the Royal Commission on State Health Insurance and Maternity Benefits—whose membership of five includes two physicians—recently submitted to the Legislature, setting forth the results of an exhaustive study of health insurance, which, while not complete, has progressed sufficiently to warrant the following conclusions. "Our investigations so far convince us that there is justification and a general demand for the introduction in British Columbia of an economically sound and equitable public health insurance plan, in the interests of the majority of provincial workers, of provincial industries, and of the State, in the more effective safeguarding and preservation of communal health, the more rational distribution of sickness costs, and the scientific

reduction of such charges to the Government, to employers, and to individual citizens."

In Alberta the tendency of the times is shown by a novel departure from accepted precedent, which has been sanctioned and established by the Government, and in the main approved by the medical profession. It has taken the form of a travelling clinic. The fear, so widely expressed by many physicians, that such a system will lead to state medicine is combated by the Director of the Clinic, who maintains that it will have the reverse effect, and that, by reaching the children in the rural communities, the principle of periodic health examinations will be carried to the parents. "Undoubtedly", he says, "the actual examinations and treatments given in the past have been of great benefit to these people, who cannot arrange to have examinations done and operations performed if the service is not taken to them". While differences of opinion may exist as to the value of this travelling clinic, as a manifestation of public policy in the domain of medicine it has great significance.

In Saskatchewan certain developments of a very radical character have taken place under government auspices, which are being studied with interest by all who are concerned with medical practice and economics. These include the establishment of union hospitals, under the control of adjoining municipalities which are supported through taxation and provide service at an extremely low rate, the employment of physicians by the municipality on a salary basis, the provision of free nursing care for stated periods, and the assumption of financial responsibility by the province for the treatment of all tuberculous persons.

Innumerable other examples of the prevailing trend in Canada could be cited from the Province of Quebec westward to the Pacific. In this connection I may say that both the Canadian Medical Association and the Department of Pensions and National Health at Ottawa are making a study of medical care and its cost, with a view of submitting constructive recommendations at a later date. The monumental task undertaken by our friends in the United States, of embarking upon a five years' program of investigation into the cost of medical care, is a further evidence of the increasing importance of attempting to deal constructively with this problem.

When under legislative authority a license to practise is granted, it simply indicates that the individual to whom it is issued has at least the minimum qualifications of a general practitioner. It does not certify, however, that he possesses special knowledge in any of the many divisions of medicine. He may be a man of the highest character and ideals, willing to place the welfare of his patient first, and to avoid operations and procedures which he has neither the capacity nor the experience to perform. This is true of the majority of practitioners. On the other hand he may be of a type, not unknown, that pretends to knowledge not possessed and qualifications nonexistent. In addressing this audience I need not accentuate the value to the community of medical skill as a factor in shortening periods of disability and reducing medical costs, but I would like to stress the urgent need of securing, in Canada at least, such amendments to the different provincial medical acts as would enable the governing bodies of our profession to pass upon the qualifications of men purporting to be specialists. The government has upon its statute books laws relating to the standardization of weights and measures and insuring the purity and quality of products offered for sale. Surely it is more important that the medical skill available for the use of humanity should be approximately as represented.

Of recent legislation in Canada dealing with medical practice that which stands out preeminently in its claim to attention is the statutory regulation of specialism in the Province of Alberta, which is the most advanced legal enactment of its kind in this country. It provides that no practitioner can hold himself out to the public as a specialist in any recognized field of special practice unless he has received from the Senate of the University of the Province a certificate that he has complied with certain specific requirements as to study and experience. Under this arrangement, bona fide specialists and the public of Alberta are being protected against uninstructed, unskilled, and unqualified persons announcing themselves as specialists. The Alberta legislation is unquestionably in the direction of a higher standard of education and

competency in specialized and indeed in general practice as well. I feel justified in saying that it will be but a matter of time until the other provinces follow the excellent lead thus given.

The nurse, as a major factor in the increasing cost of medical care, occupies an important position, and criticism of her and of the organizations which are responsible for the educational and economic policies under which she labours is free and insistent. It may be that the nursing profession has failed to provide semi-skilled, as well as skilled, service, and to develop organizations and policies to meet every type of technical and economic nursing requirement, but careful surveys covering a wide field show that the professional nurse may justly voice a claim for more consideration that she has received. She is employed less than 60 per cent of her time, earns far less than a skilled workman, and quite justly is dissatisfied with her present status and her future prospects. Is there not some plan which could be adopted under which she may be freed from economic anxiety, and may satisfy the requirements of the public and the medical profession in the matter of cost and skill? I believe there is. We have, in Canada, a national organization (established under royal charter), known as the Victorian Order of Nurses, which was founded in 1897 at the time of Queen Victoria's Jubilee by the Countess of Aberdeen. This Order is represented in practically all the larger centres of population, and has established and maintains a visiting nursing service. It engages and directs the activities of its staffs of nurses, in the care of the sick, the demonstration of nursing methods, and the prevention of disease, and offers at a reasonable price a supervised service, on an hourly or daily basis, of every type, from that supplied by the highly trained registered nurse to the humble ministrations of the home helper. The members of its staff are carefully selected, and must submit to a period of three months' probation. They are continuously employed, and are allotted duties upon a basis of special aptitude and fitness. The national scope and character of the organization, the type and capacity of those who direct its activities, its wide geographical distribution and uniform policy and methods, and its very close association with the medical profession of Canada, make it fitting that this body should undertake to solve, in part at least, the problem of nursing cost and service. This would involve some re-alignment of its policies and principles of management, and the recognition on the part of the Order and the medical profession of Canada of the possibility of securing at a minimum cost all necessary nursing services that might result from the extension of the activities of the Order to meet the requirements of rural and urban nursing.

The fundamental considerations involved in medical service are cost and purchasing power. The particular difficulty that confronts patients is that sickness or accident are unforseen, unanticipated, and usually unprovided for. Consequently, when the scourge of illness comes to the home, the patient is seldom prepared to meet the financial obligations involved. When it is realized that the annual incomes of 90 per cent of the families in the United States (and this will, doubtless, apply to Canada) is below $2,000 a year, one can understand why the problem of sickness so often assumes the proportions of a financial tragedy.

It has been computed that 30 per cent of patients are attended without charge by the medical profession, while a further 20 per cent are treated at reduced rates. Hitherto the practitioner has cheerfully borne his burden, but the increasing cost of medical education, and the greater demands that the practice of medicine makes to-day upon his time and energy, are causing a restlessness and dissatisfaction that is freely voiced. The taxpayer not unnaturally views with complacency the operation of a system that relieves him of a vast financial responsibility, but it is becoming increasingly apparent that a readjustment of the economic basis upon which the members of the medical profession offer their services to the public should be effected, under which the principle will be exemplified that "the labourer is worthy of his hire." The insistence by Dr. William Gerry Morgan, the distinguished President of the American Medical Association, in a recently delivered address, that the services of the profession of medicine to hospitals must be regarded as the contribution of the medical staffs as individuals, and that these services cannot become in any sense the property of the institution, will arouse a note of commendation in the minds

of many physicians, who, I believe, regard with disapproval and concern the increasing and inordinate demands of hospital directorates and officials for free medical aid.

While every effort should be made to lower medical costs by sound organization, voluntary co-operation between physicians, the avoidance of unnecessarily expensive methods of diagnosis, the provision of moderately priced accommodation, the availability of composite fees, and the insistence that physicians shall be adequately qualified, it seems inevitable that at the rate scientific medicine is progressing the care of the sick in the future will cost more than it has done in the past, nor may we expect that the purchasing power of the average family will be greatly increased.

How, then, may the problem be solved of placing competent medical skill within reach of all our citizens, on a basis that will ensure them every care, be just to the members of our profession, and satisfy the legitimate demands of the nurse and the hospital? In my judgment, there is only one possible solution— voluntary health insurance, instituted, organized, and controlled by the medical profession, and widely applied. The alternative is some form of State Medicine, which implies an admixture of politics, the selection of officials and practitioners upon a basis of influence rather than of competence, the building up of a bureaucratic institution, insensitive to advanced public opinion and subject to influence of an undesirable character. In the words of our honoured guest, Lord Dawson of Penn, "Medicine must be unfettered, knowledge and the restless spirit which prompts its progress need a freedom and flexibility which cannot be found within the ringed fence of administrative departments." While Dr. William Mayo says: "For the state to take over the care of ordinary illness would introduce civil service mediocrity, more drugs, more routine, and less scientific attention to the patient." The field of public health must and should be the interest of government, but private practice must remain in the hands of the individual physician if the public is to receive the highest and best type of medical care.

To the medical men of the Dominion, confronted with a demand for medical service at a lower cost, the great insurance system established under the British National Health Insurance Act of 1911 has always had a special interest, and has been studied with the hope that it might afford a working basis upon which to establish a system of health insurance in Canada, should such be found desirable. While this system may not be free from imperfections, its success as a measure applicable to 16,000,000 people is attested by evidence of unimpeachable authority. The recent proposal of the Council of the British Medical Association to establish a general medical service for the nation is of such far reaching and significant character that it is certain to have a profound influence upon economic thought in the domain of medicine throughout the Empire. It is too early, and in Canada we are too remotely situated and too unfamiliar with the needs of British medicine even to attempt an appraisal of its value and applicability to Old Country conditions. To the student of statistics it is apparent that the medical hazards and contingencies to which mankind is subject operate with unfailing regularity under the law of average, and can best be protected against by insurance—thus spreading the cost over a large number of people and reducing individual liability to a figure the average man can meet. In this connection may I quote the views of Dr. Lee K. Frankel, of the Metropolitan Life Insurance Company, an outstanding authority on life-insurance and related problems. He says: "To-day we know that fire is a hazard, we know that accident is a hazard, and we provide against these hazards under the modern method of distributing the burden of the risk. Fundamentally this is the insurance principle. Knowing this have we not found the way out? Realizing that sickness is a hazard of life, can we not apply the same principle to meet its cost as we have to the hazard of death, of accident, of fire, and to the other contingencies of life? The cost of sickness must be provided for in advance of sickness, and be distributed so that it bears equally upon all". The conclusion therefore seems inevitable that for the large majority of our people health insurance, preferably of the voluntary type, affords a sound basis upon which to supply medical aid and skill.

At a period when every effort is being made to bring about closer Empire relationships in trade and sentiment, one cannot but feel that

the harassing restrictions of licensure existing in British Countries at the present time should be modified in favour of a system of intra-Empire licensure applicable to British practitioners of adequate antecedents, good education, and approved character. The situation, however, is one of extreme complexity, and hitherto it has not been possible to arrange an understanding that, so far as the Mother Country and Canada were concerned, might bring about a consummation so devoutly to be wished. The reasons for this failure are partly economic and partly legal, but are mainly due to the apparent impossibility of devising a formula acceptable to all concerned. It is to be hoped that means may be found whereby conflicting views may be reconciled, and an understanding arrived at, under which reciprocal rights to practice may be granted upon a mutually satisfactory basis.

Abler lips than mine have paid tribute to the debt of Canada to British medical schools and teachers, and to the system of medical instruction that prevails in the Old Country and constitutes the educational foundation upon which the McGill and Toronto Medical Schools were established. McGill was organized by Scotsmen, and from its inception has followed Edinburgh methods. In Toronto and Kingston the traditions of the London, rather than the Edinburgh, school have prevailed. The Manitoba Medical College was founded by graduates of McGill and Toronto. The story of the Manitoba Medical College, which was begun in the pioneer period, when Winnipeg was still an unruly frontier town, fairly deserves an honourable place in the history of medical education.

In 1883 thirteen Winnipeg doctors joined hands, under the leadership of Dr. James Kerr (an Irishman who had served in the Ashanti campaign under Sir Garnet Wolseley, a friend of Osler and Shepherd of McGill, and a disciple of Lister), and obtained from the Provincial Government a charter for the founding of the Manitoba Medical College. The opening lecture was given on the evening of November 15, 1883, by Doctor Kerr, who had been chosen Dean. The first enrolment was of fifteen students, and for its first session the College had no settled place of abode, with the exception of a dissecting room, established in a cottage on the edge of the city. When more accommodation was needed the members of the Faculty subscribed the funds required for the provision of a larger establishment. The first graduating class, in May, 1886, numbered six. To-day the total number of graduates is close upon twelve hundred, of whom eight hundred are practising in western Canada.

But the story of Manitoba Medical College is more than a story of bricks and mortar, of statistics, of enrolments, and of graduating classes. From its beginning in 1883 it was a proprietary institution until 1919, when the medical practitioners, who were its proprietors, handed over to the University of Manitoba all its property and equipment, of which the value was about $250,000, as a gift, "on condition that the University establish a Faculty of Medicine and carry on the work of medical education in an efficient manner". With the completion in 1922 of the building program, and with the enlargement of the teaching staff made possible by the endowment fund provided for the Medical Faculty by the Rockefeller Foundation, the University of Manitoba now provides undergraduate medical instruction and training equal in all essentials to that given in other Canadian universities, and with an assured certainty of progress in accordance with the advance in modern educational methods and of constantly widening opportunities for medical research.

In bringing this address to a close, I renew the welcome with which I began— Welcome, on behalf of the medical profession of Canada, to all the visitors who have come to our country to attend this meeting from the Old World and from the New. There is diversity of national allegiance among us, but our common allegiance to our world-wide brotherhood of the healing art unites us. The *British Medical Journal* in its editorial on that great address of Osler's at the Montreal meeting of the British Medical Association in 1897, to which I have referred already, said:

> "It is delightful to note in his address, such phrases as 'we English' and even 'our National arrogance', for we are as proud of our William Osler, as he is evidently proud of us".

That we Canadians are proud of our William Osler goes without saying, and we are not least proud of the fact that we shared him with our

good neighbours to the south. To the eminent American surgeon, Harvey Cushing, the world owes the monumental "Life of Sir William Osler," a work worthy of the great man whose personality and whose devotion to the science and the art of medicine are revealed in its pages. The science and the art of medicine are not circumscribed by any geographical boundaries. They belong to humanity.

To all our visitors, I would say again, may you have pleasant and happy memories of this meeting and of your sojourn in Canada through these days of fraternity and intimacy. May those of us here assembled, whose allegiance is to the British flag, be better citizens of our own countries of the Empire, and may we all, whatever be our flag, be better soldiers in the warfare to which we are dedicated against disease, better servants in the work of our noble profession, the task of healing the ills of humanity, of alleviating human suffering and ameliorating human life.

An Address

ON

FACTORS IN THE DELIVERY OF MEDICAL SERVICES*

By W. C. RAPPLEYE, M.D.,

Director of Study, Commission on Medical Education, New Haven, Conn.,

New Haven, Conn.,

THERE are a number of essential features in the delivery of modern medical services, all of which are interdependent. There seems to be general agreement that the greatest health problem is that of making available to every individual in the community the benefits of modern medical knowledge. That knowledge is now far in advance of our application of it to the health needs of either individuals or the community. There is a wide gap or lag in our utilization of known facts and methods which is producing a number of our public, professional and educational difficulties. To close that gap and to make both available and effective our present and future knowledge regarding the diagnosis, treatment, and prevention of disease, and the conservation of normal health, mental as well as physical, is the outstanding challenge to the medical profession to-day.

There is no difficulty in demonstrating to the satisfaction of most people that physical and mental health are a nation's greatest asset. The prosperity and happiness of a people are largely dependent upon mental and physical vigor. The problem is to devise ways and means of insuring the conservation of health, not through temporary expedients but through some permanent and sound program which promises to become an essential part of that co-operative endeavour known as civilization. Any scheme dealing with public problems must be judged ultimately by the effects it has upon the individuals whom it is designed to help. If that is true, a plan of medical service must be judged from its effects upon those in need of medical advice and treatment and the quality of the services rendered. Because of its technical character, the essential feature of a competent and effective medical service is trained and informed personnel. Any plan, whether developed from within the profession or imposed upon it from without, that lessens the responsibility of the trained physician in the care and treatment of patients, or denies him the rewards of individual effort and superior ability, will in the long run be detrimental to the public welfare.

We hear a great deal about the elements and methods that have entered into business success with a great deal of emphasis upon efficiency engineering, job analysis, standardization, simplification and mass production. There are many who ask in all sincerity why some of these factors which have been so apparently successful in the business world should not be applicable to medical problems. It is a fair question to ask. Every scheme of organization and functioning is based upon an elemental "unit of operation." In medicine that unit is the care, treatment and

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advice to patients. It is possible in industry to standardize materials, tools, procedures, and machinery but no way has yet been suggested to standardize the human being, although efforts are being made through standardized mass education and industry to bring about that result. But there is no reason to suppose that sound medical service, designed to serve individual patients, will ever get away from the necessity of dealing with the problems of individuals. If that is true, it seems logical that any scheme of organizing medical services must be based upon that elementary consideration, which is too often ignored by professional organizers, efficiency experts, business executives, and politicians, who do not give due consideration to the essential character of the "job" of medical service.

Let us look for a moment at the character of the medical needs of the individual and the community. A number of studies of morbidity have shown quite clearly that only about 10 per cent of illnesses in this section of the world are those against which organized public health efforts are directed. This a reflection of the efficiency and great contribution which official preventive medicine is making to public welfare and also the extent to which the results of such work are influencing the character of medical practice. About 90 per cent of the demands for medical service are problems of individual patients. An even higher proportion of the medical needs are of a strictly individual character. These basic considerations must determine the methods of dealing with the health problem if we hope to devise a sound plan to improve medical care. The error of many professional organizers lies just here.

Other studies have shown quite clearly that 80 to 85 per cent of illnesses in the community fall into six general groups of disorders. Since that is true, the first line of an adequate medical service should be devoted to the intelligent differentiation of these six groups of disorders and their proper care and treatment. The doctor should be competent to recognize these conditions, to treat most of them and to distinguish them from others with which he may not be able to deal. Furthermore, those patients needing special examinations or consultation with specialists for the purposes of diagnosis should be referred by the physician to laboratories, hospitals, or consultants who are known to be expert and reliable in those fields for which the patient needs additional study or treatment. It is clear that the intelligent reference of patients to specialists must be done by a trained physician, not on the far too frequent basis of self-diagnosis and self-selection of specialists by patients.

In addition to this basic medical service for the diagnosis and treatment of disease and the advisory service to individuals who are ill, there is the great field of prevention which can never be separated satisfactorily from medical practice, however that may be organized. If the health advisory service to infants, children, and adults is added to the basic medical service referred to, it is quite clear that close to 90 per cent of the medical needs of the community can be met satisfactorily by such a service.

The first important feature is, therefore, the proper organization of the medical profession to meet the actual needs. Correlated with the basic medical service must be diagnosticians, consultants, and specialists, to whom those patients requiring special examinations, or the skill, experience and technical methods of specialists in diagnosis or treatment should be referred. Specialism is an essential part of moderate medical service, but it is the responsibility of the medical profession to guarantee to the public that those who claim to be specialists are, in fact, experts in their field and are trained and competent to perform the services expected of them. The time will come when we and the public will insist upon a special designation and a proper training for those who hold themselves to be specialists. Denmark, Norway, and the Province of Alberta require now a special training and designation for each of the specialties. Possibly we shall see this problem handled largely through the staff organization of hospitals, or by adoption of a restrictive licensure for specialists.

The second feature of this large problem is closely related to the plan of organization of the medical profession, for it is obvious that if such a plan is to work it is necessary that physicians in practice, whether in general practice or in the specialties, must be kept abreast of new knowledge and new developments in methods and treatment. This is the large question of continuation and post-graduate education with which you in Canada are dealing already. It seems reasonable to believe that this feature of medical service is probably the most important at the present time. It is quite necessary that ways and means be devised to keep practitioners

informed about the values, limitations, indications and use of new knowledge in the diagnosis and treatment of disease, and in the methods that are based upon that knowledge, if the patients are to receive proper diagnosis, treatment and advice regarding the prevention of illness and disability. The social, economic, and educational features of any program designed to infuse the entire profession with knowledge of new discoveries and the application of new methods challenge the most thoughtful consideration of medical educators and practitioners. Knowledge is not distributable in packages like commodities, and is safe only in the hands of those who are trained to use it.

Time will not permit a discussion of the third large feature, medical education. We seem to have been doing a great deal in medical training to unfit the student psychologically to practice medicine. Medical education has become isolated from both general education and the medical needs of practice. We must come to look upon the medical student, the interne, the general practitioner, and the specialist as different phases in the training of personnel to meet the medical needs of the community. Significant changes are being made, however, in the conception of how medical training shall be integrated with these larger problems. For example, the point of view regarding the objective of the basic course is changing rather noticeably. We are no longer interested in teaching students a mass of facts and alleged facts, but are more interested in establishing in the students sound habits and methods of study which will give them a permanent intellectual equipment which will allow them to continue their own self-education throughout their professional lives. This new conception fits in perfectly with the second point made above, namely, the importance of continuation and post-graduate education. All education, after all, is self-education, and probably the most important function of the basic course is to provide the incentive and opportunities for learning the fundamentals of self-education. The basic course, of which the interneship should be considered only a part, is being modified to present the problems of health and disease in their larger and interdependent relationships to psychology, emotional life, environment, habits of work, exercise, diet and recreation and the other factors which enter into the behaviour and reaction of the human organism, rather than as merely the mechanics of disease processes and technical procedures. Emphasis is being directed to the care, treatment, and conservation of the mental, emotional, and physical health of the patient as a whole. The technical procedures of treatment should be delegated to post-graduate education.

Quite recently there has come into medical training also a sharp emphasis upon prevention, for it is becoming more clearly recognized that many illnesses and disabilities are preventable. The idea of prevention should be emphasized as one of the major features in a medical service to the community. It is certain to become a far greater element in the practice and teaching of medicine, for everyone is in agreement that a considerable part of illness and disability is preventable. We have an enormous body of information which can be used and ought to be used in preventing illness and in conserving normal health and vigor. We must do all we can to shift the vested interest of the medical profession from ill health to good health. The physician must become a health trainer and adviser as well as a healer. It seems quite clear that the development of a sound basic medical service must include provision for the practice of preventive medicine as an integral part of general practice.

The economic aspects of medical service have received most discussion during recent months, and studies are being made in a number of places to secure data on this important question. I do not have the figures for Canada, but the expenditures for the United States can be estimated as follows:—

	In millions of dollars	*Per family*
Patent medicines and drugs	700	$25.00
Physicians	650	24.00
Hospitals (civil)	380	15.00
Nurses	200	8.00
Dentists	150	6.00
Non-medical practitioners	50	2.00
Total	2,130	$80.00

These expenditures are only about 2.4 per cent of the national income and it is interesting to compare them with various others of a less essential character. The amount of money spent last year in the United States for passenger automobiles, tobacco, candy, various forms of entertainment, soft drinks, ice cream, chewing gum, jewelry, radios and musical instruments, sporting goods and toys, perfumes, cosmetics and toilet soap was almost twelve billions of

dollars, five and a half times as great as the expenditures for all forms of non-governmental medical service, and represented about 13.5 per cent of the total income of the country. They amounted to $436.00 per family, or eighteen times the amount paid for physicians' fees, for example. These expenditures are made largely by persons of moderate means for whom the problems of medical care are most pressing. Referring to persons of moderate means, we are likely to get an idea from the volume of references in current literature to this group in our population that they are a recent development in the problem of providing medical care. But may I only refer you to the code of medical fees promulgated by Hammurabi, the King of Babylonia about 2300 B.C., which prescribed the medical fees for the different economic groups in the population. The problem is as old as history.

It has been estimated conservatively that the vital or human value of the people of the United States, if one wishes to express its monetary value, is about five times the material wealth of the country. The expenditures for all forms of medical services (including governmental services) is about 0.2 of one per cent of the human value. That is not a large amount to spend for protection and the intangible benefits received. In fact, there is every reason to believe that the present expenditures for medical care may be insufficient to guarantee an adequate service. Certainly they are reasonable.

Recent propaganda on the cost of medical care has created the impression that the largest elements in that cost are the fees of physicians. The estimates above and knowledge of the facts refute that impression, but even they do not reflect the very great services rendered by doctors for which they are not compensated, a sum which reaches close to two hundred millions of dollars a year, and a contribution to public welfare that is made by no other group in society. These figures are presented only to indicate the relative expenditures for medical services and to suggest that the economic features of medical care should not be difficult to solve, if we can but provide a plan which will insure a complete service to the population and convince the public that proper medical services are purchasable and well within our financial means, although it may be necessary to curtail somewhat on expenditures for non-essentials. The fact that the cost of medical care is not overwhelming, however, does not relieve the medical profession of its responsibility for working out a satisfactory and more universal plan of medical services.

Totals and averages, however, do not give a correct picture of the problems of illness and incapacity, owing to the great unevenness in their distribution and the fact that they are usually associated with temporary or permanent loss of income. It is possible, however, to predict with reasonable accuracy the probable amounts of illness and incapacity in a unit of population. It is this possibility that has formed the basis of various plans to distribute the economic risk involved in sickness and disability. This is the well recognized principle of insurance which has been advocated and is now in force in most of the leading countries of the world.

Collective protection against sickness was first formulated in the French Convention of 1794. A great number of organizations have sprung up in every country to provide this collective protection, of which occupational and interoccupational funds, assurance societies, friendly societies, trade union benefits associations, territorial funds, and other forms of mutual benefit societies may be mentioned. The first country to adopt national compulsory insurance was Germany (law passed in 1883). At present, eighteen countries rely partly or entirely upon voluntary insurance, and twenty-three countries resort to the principle of compulsion.

It is not my purpose to enter into a detailed discussion of this very large question, but possibly it would be worth while to point out several features of insurance that are worth keeping in mind. Sickness insurance, as developed in practically all countries, is only a part of a much larger scheme of distributing a variety of risks. In a general way, there are three groups of risks to which the employed person is liable. They are the risks of:—

(1) Economic origin (unemployment); (2) Occupational origin (occupational diseases and industrial accidents), covered in nearly every country now by workmen's compensation acts, which interpret these risks as part of the hazard of doing business; (3) Non-occupational origin (sickness, disability, invalidism, old age, maternity, death).

Another point of interest is the manner in which the various plans are financed. It does not make any difference who makes the contributions for the support of insurance providing the risks involved are covered. The sources of financial

support may be outlined briefly with one country as an illustration of each:—

Public funds alone (Portugal); employees and employers (Germany); employees, employers and the state (Great Britain); employers alone (Russia); employees alone (none).

It is clear that many of these schemes are a combination of indirect taxation, compulsory savings, state subsidy and philanthropy, the last as represented by the voluntary hospitals of Great Britain which make a large contribution to the care of the sick.

The original purpose of sickness insurance was to provide cash benefits in the form of compensation to replace wages lost during illness and incapacity. More recently, however, the purpose of insurance has been shifted from compensation to the provision of medical, hospital, and other forms of treatment which aim to restore the individual as promptly as possible to earning capacity and economic independence. This new emphasis is upon cure and restoration.

These two points of view and the efforts to combine them in a single plan have been one of the chief causes of the confusion regarding insurance in many countries. As you know, the "cash benefits" aim to provide compensation for wages lost from unemployment, incapacity, maternity, and old age, while the "benefits in kind" are designed to cover the costs of restoration, as represented by doctors' fees, hospital care, nursing, medicines, surgical appliances and glasses, etc. It appeals to a casual observer that these two major features of insurance should be separated if sickness insurance is to really provide competent medical attendance.

Time will not permit a discussion of the plans,* merits, and defects of the various insurance plans developed in the various countries, but it must be borne in mind that the compulsory scheme of England is very different from that of Germany. In the former country the plan does not provide the services of specialists (which are largely provided by the hospitals and out-patient services), and the benefits are restricted to the insured person (they do not include his family). Germany, on the other hand, has adopted a policy providing the services of specialists and medical benefits for the entire family, largely through territorial and trade funds instead of through mutual benefit societies as in Great Britain. The medical benefits provided the families of insured persons are gratuitous (largely at the expense of the medical profession). The difference in the schemes of contributions mentioned above is also important. Both of these schemes are different, also, from the so-called voluntary plan of Denmark. In that country the scheme is elective, but there are so many severe penalties for those who should and do not insure that the plan is one of indirect compulsion.

Judging from observations in European countries, there seems to be a direct relationship between the proportion of contributions used for medical benefits and the satisfaction and happiness of the medical profession as well as the quality of medical services rendered. This is well illustrated by the fact that in Denmark, where the medical services under insurance are evidently the best, the doctors receive 9 crowns ($3.60) per person per year and 18 crowns ($7.20) per family under Tariff I in Copenhagen. Under the same schedule, they receive 11.7 crowns ($4.68) per person in Jutland. Under Tariff II, they receive 3.36 crowns ($1.34) per office visit and 4.2 crowns ($1.68) plus travel expenses for domiciliary visits. Fees for calls at night and on holidays are 50 per cent greater. Compare these figures with those in Germany where the doctor receives about one mark (25 cents) an office visit. In that country, professional fees are usually on a per visit basis. In Great Britain, the present capitation basis is 9s. ($2.25) per insured person per year. In Switzerland, the office fee is usually two francs (38 cents).

The income levels below which insurance is compulsory for employed persons vary somewhat in different countries. In Great Britain it is £250 ($1,215) per year; in Germany it is 3600 marks ($900); and in Denmark it ranges from 1900 to 3500 crowns ($760 to $1,400) depending on the place of residence. About 35 per cent of the population in Great Britain, 60 per cent of the population in Germany, and 63 per cent of the adult population in Denmark are covered by sickness insurance. Eighty per cent of the physicians in Germany are dependent upon sickness insurance for a livelihood. About one-third of the physicians in Great Britain have a panel practice of an average of 1,000 persons from which they derive an annual income of £400.

It does not follow for one moment that national insurance on either a compulsory or voluntary

*Discussed in "Medical Education and Related Problems in Europe," Commission on Medical Education, April, 1930.

basis is the only method of dealing with this question. The government of Sweden made an exhaustive study of various schemes of insurance recently and recommended that no plan of national insurance be adopted. On the other hand, France is inaugurating a comprehensive scheme of compulsory insurance this year for wage earners and other economic groups in the population. There are many who believe that it is possible to avoid the serious defects of national insurance by the development of other schemes which will retain the advantages and strong elements of individual and voluntary effort as contrasted with the regimentation, standardization and regulation of patients and doctors, the level of mediocrity which is so likely to follow such efforts, the consequent loss of personal responsibility and initiative which such procedures are likely to produce and the political and financial implications that have followed every universal governmental plan.

When insurance was first proposed, and many advocates still maintain the thesis, it was said that universal compulsory insurance would reduce illness and poverty, but there is no evidence yet to show that the claims will be accomplished by such a plan. It was also claimed that the insurance program would lead to a national scheme of preventive medicine, but it has been concentrated almost entirely upon medical treatment and financial relief, with very little emphasis even upon the diagnosis of disease (insurance practice is largely made up of dispensing prescriptions and signing certificates for various forms of "cash benefits"). The theory and promises of insurance have yet to be realized.

Very promising efforts are being made in the United States and Canada in the development of existing institutions and agencies to provide satisfactory medical services for the very same elements in the population for which all plans of compulsory and governmental insurance are designed. We see a rapid development in the program of hospitalization, of hospital centres in smaller communities, clinics (free, part-pay and pay) home and visiting nursing, laboratories and a great variety of school, industrial and other forms of organized medical, nursing, dental, and hospital services, which, in many sections, are meeting the problems satisfactorily. A large number of industries have developed local "establishment" insurance programs and there are indications that this manner of distributing costs of medical care will grow. The "community chest" idea, now used in 350 of our cities, is only another method of voluntary taxation to provide medical and social relief.

It is quite clear that the largest factors in the increase in the cost of medical care are associated with facilities for diagnosis, the services of specialists, and the use of numerous ancillary services, particularly nursing and dentistry. The first is largely represented by laboratories and hospitals, and in many sections of the country these facilities are being provided by institutions supported by taxation, philanthropy, and endowment. A great many laboratory and special examinations are, of course, unnecessary as are also a considerable proportion of surgical procedures, and these unnecessary services are a distinct factor in the increased cost of medical care. The fees charged by specialists are often out of all proportion to the services rendered, when compared with the fees of general practitioners.

No discussion of medical economics can ignore the problem of the distribution of physicians in rural communities. A study of the changes in the number of gainfully employed persons in agricultural pursuits and their contributions to the national income suggest at once the basic economic character of this problem. Physicians in a system of free competition are bound to react to the shift in economic status of rural communities and that is probably the largest factor in the uneven distribution of physicians.

This problem is not unique in America, for every nation has had to face the same question. In Sweden the problem has been met by providing medical care in the sparsely settled areas through salaried state medical services. In one-half the land area of Scotland, the medical services are provided by subsidy from the Highlands and Islands (Medical Service) Fund created by Parliament in 1913. In your own province of Saskatchewan you have municipalized medical services on a salary basis in twenty-six towns. I believe a similar plan is being developed in Manitoba. In Alberta, the travelling clinics are endeavouring to provide medical care in the sparsely settled areas, and salaried physicians are also employed in certain areas. Good roads, the telephone and the automobile have done most to meet the problem here for most areas near urban communities, particularly for those in the rural districts who are able to pay for the services from a distance or are able to go to the towns and cities for care. Rural hospital centres, home

nursing services and other devices are moving in the direction of solving this situation.

All of you are familiar with the suggestions made from time to time to solve the distribution of physicians by providing a short medical course for those who will practice in the country. No one suggests how we would force the less well trained physicians into the rural sections, however, and it may be well to refer to the fact that this suggestion was tried in Europe and has been almost forgotten. Germany recognized two grades of physicians but discontinued that recognition in 1852. The Apothecaries' Act of Great Britain in 1815 established a sub-standard medical practitioner, but the Medical Act of 1858 discontinued that recognition. The "Wundärzte" in Austria were given a two years' training until 1810, when the course was made three years in length. Abolition of this training was proposed in 1848 but it was not accomplished until 1872. In the Netherlands, physicians trained for country practice were not permitted to enter the cities to practice, but in 1860 recognition of that group was discontinued.

I have attempted in this random discussion to bring into relief a few of the problems of medical service without suggesting any single solution, for the good reason that there is not likely to be a single solution. It must be borne constantly in mind that many of the programs in Europe were initiated and are controlled to-day by political rather than medical considerations, partly because of the confusion between financial benefits and professional services. The most powerful political organizations in Germany are said to be the "Krankenkassen". For political purposes, a doctor is a doctor and the cheaper his services can be purchased the better for the insurance scheme, temporarily at least.

The growth of industrial medicine and discussion of the possibilities of some form of sickness insurance require that all those interested in medical care shall keep clearly in mind that the most important factor in a sound medical service is the quality of medical care, not the scheme of organization or the method of financing. There are features of finance, problems of organization and interests of the public in this problem of medical care, but the essential character of it is professional and technical. The quality, interpretation, and correlation of scientific knowledge depend upon trained personnel who know the significance of that knowledge and how to use it. The judgment, knowledge, and skill required for the diagnosis and treatment of disease, and the conservation of normal health in the light of present day knowledge, can be provided only by mature, well trained, and experienced physicians and their trained helpers. Any plan of medical service devised for the benefit of the public which is designed to be permanent must recognize the essential features which these requirements imply.

There are two outstanding trends of our age, the democratic and the scientific. The hope of democracy depends upon leadership. We look for such leadership in law, education, business, and banking and there is no reason why the public should not expect it of medicine. We possess the knowledge and personnel to solve a large national problem, and, possessing that knowledge, we are responsible for working out a satisfactory solution. You in Canada are working upon a constructive program directed and supported by the best brains of the medical profession which aims to provide and retain leadership in health matters and in the program of medical services through organization of the profession, sound schemes of medical and post-graduate education, and constructive, courageous, public policy and publicity.

DUODENAL ULCER IN A NEWBORN CHILD.—I. S. Schwartz describes the clinical aspects and treatment of a fatal case of perforating duodenal ulcer in an infant two days after birth, and discusses the pathology of the condition. The only symptom is sudden uncontrollable hæmorrhagic diarrhœa, which is sometimes accompanied by hæmatemesis, and causes a severe and fatal anæmia. Operative treatment is not advisable, but good results have been obtained by combating the anæmia by transfusion. The condition is attributed to some infection, or to a thrombus in the umbilical vein with subsequent embolism into the vessels of the duodenum and stomach; retrograde emboli may also pass from the umbilical vein into branches of the portal vein. In the case here reported the child had pemphigus neonatorum simplex; the Wassermann reaction was negative. The initial attack was treated by intramuscular gelatin, and 2 per cent calcium chlorate was given by the mouth; the hæmorrhage was arrested for forty-eight hours, but then recommenced, and 10 c.cm. of the mother's blood was transfused without result, the child soon dying from extreme anæmia.—*Zentralbl. f. Chir.* 270, Feb. 1, 1930.

A PRELIMINARY NOTE ON THE DETECTION OF AN INSULAR HORMONE IN THE DUODENUM*

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MONRO (Manual of Medicine, London, 1906, p. 241) credits C. Workman with the statement that he found pronounced hypertrophy of the duodenal mucosa in cases of diabetes mellitus which came to autopsy. Heller (*Arch. f. Exper. Path. u. Pharm.* **145**: 343, 1929) has shown that extracts of duodenal mucosa when injected into normal rabbits prior to an injection of 0.5 grm. glucose per kgm. weight prevented as marked a hyperglycæmia as in rabbits not so treated and also caused the blood sugar to return more rapidly to normal or subnormal levels.

Extracts prepared by us have a similar physiological action in normal rabbits and dogs. In depancreatized dogs with marked hyperglycæmia these extracts have no influence on the blood sugar. Heller's extracts were slightly coloured and gave a trace of protein with Millon's reagent. The extracts which we have prepared have been water-clear, gave none of the colour reactions of proteins or peptone, and were entirely negative to Millon's test. The active principle is not adsorbed on bone charcoal or purified Fuller's earth, which has a high capacity for removing alkaloids from solution. Further work is in progress regarding the possibility of separating the active principle, which must be a relatively simple compound..

Secretin is a factor which must be considered, but Still and Shpiner (*Am. J. Physiol.* **91**: 496, 1929) have shown that pure secretin has no hypoglycæmic effect. The criticism might also be raised that these extracts contain traces of insulin, but Heller claims that his method of preparation eliminates the presence of insulin. Furthermore, since the active principle did not influence the blood sugar of depancreatized dogs the possibility of insulin being present can be definitely discounted.

It would appear from these experiments that a substance exists in normal duodenal mucosa which has a specific stimulating influence on the islets of Langerhans, in other words, an insular hormone. This, coupled with Workman's observations, introduces a new factor into the etiology of diabetes mellitus. Insular failure may result from excessive stimulation of the islets by the duodenal hormone produced as a result of excessive sugar intake over long periods. Secondly, inflammatory conditions in the duodenum may lead to a deficiency in the hormone, followed by a diminished activity in the islets themselves resulting in a hyperglycæmia.

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We are indebted to Dr. A. B. Macallum, F.R.S. for his suggestions and criticisms throughout the course of this work.

SOME CLINICAL FEATURES OF AIR SWALLOWING.—Asher Winkelstein asserts that air swallowing is frequently a cause of symptoms, and it occurs normally as a physiological act. Eructatio nervosa, or functional nervous belching, occurs in neurotic individuals as a purposeful exaggeration of the normal. Belching is often a symptom in, or, an equivalent symptom of, organic gastro-intestinal, gallbladder, liver or cardio-vascular disease. This may be called eructatio symptomatica. In another group, gastric pneumatosis, air is trapped in the stomach and causes gastric, respiratory and cardiac symptoms. In gastro-intestinal pneumatosis, swallowed air passes from the stomach into the small and large intestine, giving rise to a new clinical syndrome, chiefly with intestinal symptoms.—*J. Am. M. Ass.* **94**: 1480, May 10, 1930.

THE PROBLEM OF THYROID INTOXICATION

BY ROSCOE R. GRAHAM, M.B.,

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THAT the problem of thyroid intoxication is worthy of discussion is evident in view of the tremendous economic loss which is occasioned by the high incidence of this disease in certain geographic areas. The available therapeutic procedures are still empirical and are not based on sound scientific data.

In order to attempt an understanding of thyroid intoxication it is imperative to have a broad conception of the associated disturbances. One is forced to the conclusion that, while the thyroid is obviously grossly abnormal in the vast majority of cases, there are patients suffering from extreme hyperthyroidism in whom it is impossible to detect in the thyroid gland any departure from normal. This leads to the inference that the other endocrine glands are upset to a greater or lesser degree. Menopausal disturbances and sterility are indicative of a disturbed ovarian or testicular function. The changes in blood pressure suggest a possible adrenal dysfunction. The disturbance of sugar tolerance indicates a dysfunction of the pancreas. In addition, there is very definite evidence of an upset in the sympathetic nervous system, which may be either a cause or a result of the hyperthyroidism. This is indicated by flushing of the skin, increased perspiration, and intolerance to heat. That the parasympathetic system is also involved is evidenced by the occurrence of vomiting and diarrhœa in the so-called "hyperthyroid crises". That the somatic nerves do not escape is evidenced by the associated muscle tremor. Hence, in a broad way, thyroid intoxication is a dysfunction of the endocrine glands, the sympathetic, the parasympathetic and the somatic nervous mechanisms.

ETIOLOGY

May we consider the factors responsible for this clinical picture? It is striking how often mild intoxication is associated with the stresses of normal physiological processes, namely, the enlargement of the nodular goitres during menstruation, the activation of an otherwise quiescent gland during pregnancy or the menopause. I am sure that no clinician interested in thyroid intoxication has escaped the difficult problem of severe and prolonged thyroid intoxication, which disturbance had been erroneously considered a normal accompaniment of the menopause. Fatigue and emotional strain immediately precede the onset of a toxæmia, too frequently to be disregarded as etiological factors. This would seem to support the assumption that these influences causing undue stimulation of the sympathetic nervous system are sufficient to precipitate acute hyperthyroidism. One cannot disregard infection—a very real factor in precipitating an acute toxæmia. The instances commonly noted in clinical practice are usually associated with the respiratory tract, influenza and tonsillitis being most frequent.

In addition, it has been suggested by McCarrison[1] that the thyroid is capable of elaborating other substances than the iodine-containing colloid called thyroxin. Such substances may of themselves be capable of disturbing the metabolic processes. Recently substances other than thyrotoxin have been isolated by Kendall.

CLASSIFICATION

A classification of goitre is suggested to you with certain temerity. It is a striking commentary on the meagreness of our knowledge of this disease, that each individual worker finds it necessary to make a classification different from those of his colleagues. We have, however, in the Toronto General Hospital, agreed on the following classification:—

(A)	Diffuse	(a) 1. With hyperthyroidism 2. With hyperthyroidism —adolescent (b) Without hyperthyroidism (c) With hypothyroidism
(B)	Nodular	(a) With hyperthyroidism (b) Without hyperthyroidism (c) With hypothyroidism
(C)	Diffuse and Nodular	(a) With hyperthyroidism (b) Without hyperthyroidism

(D)	Inflammatory	(a) Acute suppurative non-suppurative (b) Chronic
(E)	Malignant	(a) Carcinoma (b) Sarcoma

This is practical and workable, avoiding debatable points which would raise doubt as to the proper classification of an individual case.

In this connection it is interesting to note the percentage of such cases in public and private practice. The following is our percentage in the series during the last two years:—

Types	*Percentage*
Diffuse, with hyperthyroidism	60
Diffuse, without hyperthyroidism	1.3
Nodular, with hyperthyroidism	5.25
Nodular, without hyperthyroidism	1.25
Diffuse and nodular, with hyperthyroidism	32
Diffuse and nodular, without hyperthyroidism	0
New growth—carcinoma or sarcoma	0.25
Inflammation, acute	0
Inflammation, chronic	0.25

CLINICAL FEATURES

Whether or not nodular goitre is the result of the development of true adenomata has not, from a clinical standpoint, the significance which might be inferred from reading a discussion of the various phases of this subject. There is surely no doubt that there are two distinct clinical pictures associated with hyperthyroidism. The first is an acute fulminating toxæmia occurring in young persons, which rapidly reaches a sufficient severity to prevent the patient continuing with any responsibility. This is the picture of a classical exophthalmic goitre. The second group presents an insidious onset, associated with a nodular enlargement of the thyroid, such nodular enlargement having been present and unchanged for many years. The patient finally consults the physician, complaining of that vague disorder known to the laity as "nervous instability". After investigation such patients are loath to believe that this apparently harmless and unchanged nodule in the neck could possibly be the cause of such ill health.

Having recognized these two large clinical groups, the important point is not whether the nodular goitre is the result of adenomata in the gland or not, but to realize that a nodular goitre, present and unchanged for years, is capable of ultimately rendering the patient unable to assume responsibility. The course and onset of the toxæmia in a nodular goitre is so insidious that it often kills without revealing the error of inadequate treatment.

The cardinal symptoms upon which one must base a diagnosis of thyroid intoxication are tachycardia, fatigue, tremor, loss of weight, intolerance of heat, flushing and excessive perspiration. The differential diagnosis is mainly concerned with the exclusion of an active endocarditis, an active pulmonary tuberculosis, and the untangling of that weird but distressing condition which since the war days has crept into the literature under the label of "disordered action of the heart."

DIFFERENTIAL DIAGNOSIS

One is also confronted with the differential diagnosis in the neurasthenic patient. It is well to bear in mind that the neurasthenic patient is not immune from thyroid intoxication, and, if the latter occurs in such an individual, we may be able to control the hyperthyroidism, but still have left a neurotic patient. The failure to cure the neurosis should not be used as evidence against our efficiency to control hyperthyroidism.

There are many who still cling to a basal metabolic estimation as being a simple expedient which will solve all the diagnostic difficulties of hyperthyroidism. In other words, with such a conception, hyperthyroidism is impossible in the absence of a definitely elevated basal metabolic rate, and, secondly, an elevated basal metabolic rate renders the diagnosis of hyperthyroidism absolute. If one is eager to operate upon a large number of goitres, I know of no way in which one's conscience can be soothed more easily than always to accept a reported increase of the metabolic rate as evidence of hyperthyroidism. We know from the work of Sandiford and Wheeler[2] that pregnancy is associated with a definitely increased basal metabolic rate, which at the eighth month is elevated as much as 25 to 30 per cent. In this connection, it is curious that lactation is not accompanied by an increased rate. Fever, too, is responsible for an increased rate. Recently we had a patient suffering from an illness in which a nodular goitre was present and the basal metabolic rate estimation was + 80. This patient, however, was suffering from a lymphatic leukæmia, the white blood count being 800,000. These factors in causing an increased basal metabolic rate, however, are so obvious and easily detected that

they are unlikely to lead to radical therapy directed towards the thyroid gland. Yet how often do we have basal metabolic reports + 17, + 18, in cases when the clinical diagnosis is much in doubt? I am perfectly convinced that a basal metabolic rate of + 17, taken alone, is not of the slightest value in most instances. The personality of the technician, the temperature of the patient, and the environment under which the test is carried out are in my mind most essential details to consider. While our estimations produce certain figures, we need not question that this was the metabolic rate of the patient at the time and under the conditions of the test. The question which we must ask ourselves —is this metabolic rate basal?—and in this I feel lies the great danger, weakness and fallacy of placing too much reliance on basal metabolic estimations. In the exophthalmic goitre of the acute fulminating type so commonly seen the basal metabolic estimation is interesting in so far as it indicates the degree of toxæmia, but I am sure no experienced clinician would hesitate to make a diagnosis of exophthalmic goitre if he were debarred from the information which a metabolic test offers. I fear that in regard to the nodular goitres my attitude is that of a heretic, in so far as basal metabolic estimations are concerned. If one can be sure (and I cannot on physical examination alone) that no nodules are present in the thyroid gland, then I feel that a diagnosis of hyperthyroidism in the presence of a normal basal metabolic estimation is very questionable, if not invariably wrong. On the other hand, I am firmly convinced of the fact that if nodules are frankly present in the thyroid gland an estimation of the metabolic processes revealing a rate within normal limits is no criterion of an absence of thyroid intoxication.

TREATMENT

The rôle of iodine in thyroid intoxication must be discussed. Despite the fact that this drug, as used by trained clinicians in the treatment of hyperthyroidism, has revolutionized the morbidity, the mortality, and the celerity with which the symptoms have been controlled, I am firmly of the opinion that the re-introduction of iodine in the treatment of thyroid intoxication has been accompanied by immeasurably more harm than good, if one takes into consideration our total goitre population.[5 to 10] One can readily understand the difficulty which confronts the general practitioner in convincing a patient with a large colloid goitre that the enlargement is innocuous, and needs no medical therapy. The line of least resistance is to prescribe something, and, unfortunately, that something is too often an iodine preparation. The mass of evidence that iodine hyperthyroidism is real and of no mean proportions is incontrovertible. That the profession is responsible for all the instances of iodine hyperthyroidism is, fortunately for us, not true, because the laity can prescribe and buy for themselves at any druggist's shop a solution of iodine, which they can use as they choose. Prolonged iodine administration in thyroid intoxication creates a most difficult clinical and technical problem, greatly increasing the risk of operation, and the residual morbidity is great. I have personally had no death in exophthalmic goitre for four years where the patient had not had a long course of iodine before coming for treatment. I am inclined to agree with other workers that iodine produces an increased amount of colloid, resulting in a flattening of the epithelium, an increase in the size of the acini, and vacuolization of the colloid. Prolonged administration of iodine exhausts the ability of the gland to store colloid, but unfortunately does not alter its ability to secrete an excess of thyroxin. However, the occasionally dramatic effect of iodine in the treatment of hyperthyroid post-operative crises makes one subscribe to the theory that there must be a circulating toxin which is rendered innocuous by the introduction of iodine. In a recent case, the administration of 31 grains of sodium iodide intravenously was followed, in about one and a half hours, by very marked placidity in the patient's demeanour, which persisted for about four hours. Following this procedure five grains of sodium iodide were introduced intravenously every two hours for ten hours, at the end of which time the patient's clinical condition was such as to cause no anxiety. This prompt effect must be due to something more than the action of iodine on colloid storage.

We have subscribed to the following four indications for the use of iodine in thyroid disease:

(1) Prophylactic:—
  (a) Given to children, starting at 10 to 12 years of age and continuing to 20 years of age, using 10 mgrm. of iodostarine once weekly, thirty weeks in the year.
  (b) A similar dose given to women during pregnancy.
(2) In the treatment of adolescent goitre.
(3) To patients under 25 years of age suffering from harmless colloid goitre. We have found that to combine small doses of thyroid extract with iodine more often causes a regression in the size of such glands than when iodine or thyroid extract are administered alone.
(4) The pre- and post-operative administration of iodine. We never consent to the pre-operative administration of iodine to a patient suffering from thyroid intoxication unless the patient is in hospital, prepared to submit to a resection of the thyroid gland when in our judgment the optimum time for such procedure arrives.

Our administration of iodine is identical in patients suffering from the diffuse or the nodular goitres. The explanation of the satisfactory results which we have experienced in the administration of iodine in nodular goitres is that, with but very few exceptions, we have histological changes in the gland surrounding the nodule. We are convinced that the prolonged post-operative administration of iodine is beneficial. We give five or ten minims of Lugol's solution daily for six to twelve weeks following the resection of the gland, the dose and duration being determined by the degree of toxæmia from which the patient suffered on admission.

While the diagnosis is readily made in the frank cases of hyperthyroidism associated with either a diffuse or nodular enlargement of the gland, there are five atypical groups which require special consideration.

1. Thyroid intoxication occurring in a patient who has a diffuse enlargement of the gland persisting from adolescence.

It is doubtful whether these so-called innocent adolescent enlargements are entirely symptomless. We have very grave anxiety regarding the proper procedure to follow in the patient under twenty years of age with the clinical picture of thyroid intoxication. In our experience such patients react violently when any operative interference is undertaken, and quite disproportionately to one's experience with similar patients a decade older. A large percentage eventually suffer from hypothyroidism, and at this juncture I should like to stress the difference between hypothyroidism and myxœdema. Very few will become frankly myxœdematous, but we have a group of persons in whom the basal metabolic estimation is −20, which is scarcely low enough to diagnose a true myxœdema. I am convinced they suffer as a result of this lowered rate, but do not present the classical picture of myxœdema. Another group will develop dysfunction associated with the other endocrine glands, notably the pituitary gland. Despite the high incidence of unsatisfactory results with any form of therapy, and the violent reactions which accompany any operative interference, one is forced occasionally to undertake operation in order to save the cardiovascular system. However, prolonged rest, with the removal of all foci of infection, particularly diseased tonsils, should always precede any operative interference. In this group one probably can with advantage give small doses of Lugol's solution. Occasionally this may be supplemented by small doses of thyroid extract. The rationale of this latter procedure is explained by the conception that the activity of the gland has been evidently stimulated by the physiological requirements of puberty. If such excessive demand can be met in part by the giving of thyroid extract, the gland may return to the resting stage. In this group radiation by x-ray or radium has its greatest usefulness.

2. The patients over 25 years of age with an apparently symptomless nodular goitre comprise the second group.

One is constantly consulted by female patients with this clinical problem. They seek advice for two reasons—first, because of the cosmetic disfigurement; secondly, to find out whether they are harboring a potentially dangerous nodule, and particularly whether it is dangerous should pregnancy occur. What should our advice be? It should be based on the life history of patients with this condition. Life insurance companies count on 20 per cent of such nodular goitres becoming definitely toxic. From 1 to 4 per cent will develop carcinoma. Of the toxic group, myocardial damage is done in well over 50 per cent before the diagnosis is made and the nodule removed. The morbidity of patients operated on for nodular toxic goitre is greater than the similar morbidity in patients operated on for a diffuse toxic goitre. Many of these nodules become cystic, and hæmorrhage is very prone to occur into these cysts, sometimes creating a desperate surgical emergency. Hence, we should place the above facts honestly before the patient,

and add that the operative risk in trained hands is negligible. With such information we have no choice but to advise the resection of all nodular goitres in patients after 25 years of age.

3. Hyperthyroidism occurring during pregnancy presents a third group.

Our experience has led us to consider such a clinical problem solely from the standpoint of the hyperthyroidism. We have had 25 such cases in which we have resected the gland. In no instance have we lost a mother or had a miscarriage follow this procedure. We have learned, however, that it is of great importance not to be hasty with the pre-operative preparation of such patients. Because of the increased metabolism associated with the pregnancy they react more violently than they would were pregnancy not an accompaniment.

4. The fourth group includes patients suffering from a nodular goitre which has been present and unchanged for years, having a normal basal metabolic rate, but a definite cardiovascular disability, without any history of rheumatic fever or other endocarditis. Many so-called chronic heart cases are really unrecognized thyro-cardiacs. The presence of the nodules causes such an extensive pressure atrophy of the surrounding gland that we have an explanation of the associated normal basal metabolic rate. Many cases have a definitely established auricular fibrillation. Others suffer from a widespread arthritis. I have very decided views in regard to the rôle which the nodule plays in the disability of such patients. Again let me repeat that the course and onset of the toxæmia in nodular goitre is so insidious that it often kills without revealing the error of inadequate treatment.[21] Recent work by Dr. A. A. Fletcher in our hospital has shown that metabolic disturbances are almost constantly associated with chronic arthritis, and that thyroid dysfunction is a surprisingly common accompaniment in such cases. Burton Hamilton's hypothesis,[14] and the recent follow-up report of cases by Labey, intrigue one. They conclude that the damage done to the cardiovascular system from thyroid intoxication is due solely to mechanical over-strain, and not to a definite degenerative change in the heart muscle. This would explain the delightful surprises which follow the resection of nodular goitres from patients who appear to be suffering from a hopelessly damaged cardiovascular system. Hence all patients who had a damaged cardio-vascular system which cannot be explained by an ancient endocarditis, and who harbour nodular goitres, should be advised to have their thyroid glands resected. The results will be often a delightful surprise.

5. The fifth group is represented by the patient, usually at the menopausal stage, with a large colloid goitre which has been present and unchanged for years. At this time there are nervous manifestations, in which the patient is more irritable, much more easily tired, and unable to sleep. The pulse rate, while it may be easily accelerated, is not constantly so. There is no gross weight loss, nor is there any disturbance in heat tolerance, nor any flushing or perspiration. The basal metabolic estimation may be within normal limits. If a complete physical examination reveals no organic cause, and an enquiry into the social history does not reveal sufficient evidence for the condition found, then it is my opinion that one is unwise to conclude that this is a natural accompaniment of the menopause, but rather should advise the patient to have the gland resected.

Having arrived at the diagnosis of thyroid intoxication in an individual case, what therapeutic measures have we to offer? First—rest; second—radiation by x-ray or radium; third—reduction of the gland by resection. The physiological principle behind these three forms of therapy is a slowing of all the metabolic processes to a basal rate. Rest is essential, no matter what other therapeutic procedure may be used. Such rest must be absolute and as strict as that used in cases of active pulmonary tuberculosis. That rest alone, if sufficiently enforced and prolonged, will cause a recession of the intoxication in many cases of exophthalmic goitre is not questioned. That it will be accompanied by a permanent freedom is very doubtful. The results of such management in nodular goitres are much less happy.

To speak with any authority on x-ray and radium therapy is impossible. Our early experiences were so unhappy that we now do not use it in our own practice, except in the instances of severe thyroid intoxication occurring in patients under twenty years of age. In this group we have had several most satisfactory results,

but I feel that the administration of radiation should be controlled by an expert; otherwise tragedies can occur from this form of therapy just as surely as from injudicious resection of the gland.[18] A recent series in our own department shows only 43 per cent of cures, and the treatment consumes many months.

When one surveys in a broad way the mortality, the morbidity, and the economic factor, surely there can be no doubt that in the hands of a surgeon trained in the handling of thyroid intoxication, resection of the gland offers the safest, the surest and the best therapeutic procedure available at the present time. It brings the toxæmia under control most promptly. One must remember that the prognosis depends upon the duration of the toxæmia. The longer the toxæmia has been present, the longer the convalescence required, and the more guarded must be our prognosis. I most heartily subscribe to Lahey's statement that the responsibility for the death of a patient suffering from thyroid intoxication must rest on the shoulders of the physician who has treated the patient until he is suffering from a grave disability, accompanied by visceral damage.

THE PRE-OPERATIVE PERIOD

The pre-operative investigation of hyperthyroid patients is of the utmost value in securing a successful issue. How often does one find associated conditions, notably foci of infection and glycosuria. In our experience, while it is impossible to say that the glycosuria was a result and not an accompaniment of the hyperthyroidism, there is no doubt that the tolerance of the diabetic patient to carbohydrates is materially decreased when accompanied by thyroid intoxication.

Our ideas as to the proper time to deal with associated foci of infection are very definite. Upon superficial consideration it would seem wholly logical to deal primarily with such foci, in the hope that the hyperthyroid symptoms would be ameliorated. After several experiences where a hyperthyroid crisis was precipitated by the removal of infected tonsils, we now invariably control the hyperthyroidism before dealing with the foci. It must be stressed here that it is extremely important, in order to ensure a satisfactory permanent result, that all foci should be efficiently dealt with as soon as permissible after the resection of the gland.[3] Latent tetany is occasionally found, and serves to put one doubly on guard so that no further interference with parathyroid function occurs during the operation.[13, 15, 20]

The investigation of the cardiovascular system by a competent internist is imperative in cases associated with severe cardiovascular damage. The electrocardiograph will give information which is of the utmost value in determining the prognosis. We are lead to believe by our cardiologists that a low voltage is the most definitely serious manifestation. We have on several occasions found a negative T wave in the second lead restored to normal some months following resection of the gland. Such gives us great comfort that this apparently serious finding may be robbed of some of its terror in the patient suffering from hyperthyroidism.

Our pre-operative therapy includes absolute rest in bed, not even the privilege of going to the bathroom, the administration of Lugol's iodine, 10 minims three times a day, the administration of luminal in doses up to 1½ grains night and morning, and repeated during the night if the patient is not sleeping. The use of digitalis[16] is so varied in many clinics that one tries to keep an open mind regarding the real value of this drug. However, after the experience of using digitalis as a routine, and then discarding it we have now returned to the routine digitalization of all the patients, even though they be suffering from a tachycardia not associated with any irregularity. Apart from the nausea which accompanies the complete digitalization of patients, and which is very transient, we have been unable to find any real disadvantage in the routine administration of this drug. On the other hand we feel that it has tremendous value, as it will anticipate and prepare for the occurrence of an unexpected post-operative auricular fibrillation.

Forced feeding and forced fluids are of the greatest value. A diet high in carbohydrate and with a relatively low protein content is admirable. It has been estimated that the caloric value of the diet must exceed the increased requirements as evidenced by the basal metabolic rate by 75 to 100 per cent.[4] Fluids and nourishment are well combined in a glucose drink which consists of a pound of commercial glucose to a

quart of water, made palatable by the addition of lemon and orange juice.

Psychotherapy is of the utmost value in the treatment of thyrotoxic patients. To secure for the patient a mental placidity is a triumph. It is well for him to realize that his operation is not a misfortune or a tragedy, but a boon which is denied the patient suffering a similar disability due to organic heart disease. Such a conception has often changed the mental attitude of a patient from one of gloom and despair to that of a real optimist. It is extremely important that the patients develop a state of mind which makes them eager to be operated upon, confident that the result will be successful.

One has then to determine when, in the pre-operative course, the optimum time has arrived to undertake resection of the gland. If one is guided solely by the basal metabolic rate and the pulse rate, the conclusions may be very erroneous. The patient's demeanour and mental attitude are most valuable. This can be illustrated by citing two cases. In the first, the basal metabolic rate has been reduced from +60 to +15. The pulse rate has been reduced from 130 to a fairly constant rate of 90, and yet one finds a patient apprehensive, wondering if his operation will be to-morrow, a tremor in the voice and marked tremor in the hands, and a moist skin and flushed countenance. Such a patient, despite the splendid improvement in the basal metabolic rate and in the tachycardia, has not reached the stage where operative interference can safely be undertaken. The second patient, whose basal metabolic rate is +30, and who, despite one's greatest efforts, has a pulse rate ranging from 100 to 120 does not seem to be the ideal subject, yet this patient presents an air of placidity, a complete acceptance of the situation, no evident rebellion at the trick Fate has played, confident that the best is being done, and ready to accept operation at any time that it might be suggested. Such a patient rarely has a flushed face, and presents a clinical picture which permits operation to be undertaken with safety. One of the most valuable single factors which we rely upon in determining the optimum time to undertake operation is a flattening of the pulse curve. A pulse curve, even though it does not go above 110, but which is characterized by a sharp rise and fall during the 24 hour period is a warning to withhold operation. We rarely decide when to operate upon very toxic cases earlier than the evening before the operation. The patients are so disciplined that they are not disappointed if the day is suggested and operation is postponed. All the facts are placed before them at the beginning of treatment; thus they do not have any shocks or surprises during their pre-operative course. absolute frankness in placing the whole problem honestly and plainly to the patient is of the greatest value to the peace of mind of the patient, as well as the surgeon. It never entails any prolonged explanations during the pre-operative preparation. However, eternal vigilance is essential in determining the opportune time for this important stage, namely, the undertaking of the operation.

In considering the factors in the operative procedure which are essential to a successful issue, the most important single consideration is to confine one's operative procedure to the course determined before the patient was sent to the operating room. In other words, if the condition of the patient be such that one's judgment determines that one lobe might safely be resected, then the fact that the patient is in good condition, and that the anæsthetist gives one additional assurance of absence of profound reaction, creates a great temptation to proceed with resection of the other side. One's judgment at this time is not sufficiently good to alter the carefully considered pre-operative decision regarding the extent of the operative procedure. We have been able to confirm in numerous instances the dictum enunciated by Sise,[11] that the patient who comes to the operating room flushed and asleep from a sedative is much more likely to cause anxiety than the pale-faced patient who is awake. We have been attributing this to an unhappy reaction of the patient to hyoscine. Since we have adopted the principle that the time factor is to be disregarded, and have been keeping our patients under observation longer during the pre-operative stage, we have reduced the number of stage operations very definitely (in present series 5½ per cent); in fact, except with an unusually difficult problem, if we have to do a stage operation we conclude that the patient was sent to the operating room at too early a date.

THE OPERATION

The value of an operating team in thyroid disease is unquestionable. The peace of mind of the surgeon and the safety of the patient are very definitely enhanced when surgeon, assistant and anæsthetist are all working in unison.

The problem of anæsthesia we have solved by utilizing a field block with ½ per cent novocaine and analgesia with nitrous oxide gas, except in case of the large intrathoracic adenomata, where we feel that local anæsthesia alone has a distinct advantage. The mental peace of the patient in having an analgesia from nitrous oxide far outweighs any disadvantages which it may entail. Furthermore, the progress of the patient's blood pressure and pulse must be watched continuously during the operative procedure. This is best done by a trained anæsthetist. Where we have an inordinate rise in pulse pressure by virtue of a rising systolic and a relatively unchanged diastolic pressure we take this as a warning to terminate the operation. Further, the acceleration of the pulse rate is watched closely, and where it is steadily rising and reaching a rate over 150, in most instances it makes one consider seriously whether the operation should be proceeded with.

While toxic goitre patients, when very ill, repeatedly stress the fact that they are not particularly interested in the scar so long as they are restored to health, yet all are very conscious of their scar six months after they have recovered from their intoxication. With this end in view, it is extremely important to place the scar where it will be least conspicuous, and to make it as small as is consistent with safety. We have devised a goitre marker, which consists of a piece of aluminum with a slot slightly off centre. This gives us a very good guide to the height at which the incision should be placed above the sternal notch, so that when slippage occurs the scar does not slide down on the chest wall. By marking out this skin incision with a needle, and by putting a few vertical scratches across, one is able to restore the anatomical continuity.

If the platysma muscle is divided and reflected with the skin flap to the upper margin of the thyroid cartilage it will rarely be necessary to divide the strap muscles. The gland is then exposed by most painstaking dissection, and before it is disturbed at all the superior thyroid vessels are grasped in three hæmostats, the points of which are directed away from the larynx. In this way it is impossible to injure the motor branch of the superior laryngeal nerve. The gland is then lifted gently out of its bed and the covering of cervical fascia wiped off it with gauze.[12] A line of hæmostats is placed relatively high on the lateral wall before the gland is incised. In this way one maintains a continuity of the posterior capsule, and avoids injury directly to the parathyroids or severe disturbance of their blood supply. Thus post-operative tetany is reduced to a minimum. In the reconstruction of the wound, we unite the sterno-thyroid muscles in the mid line. They not only act as an excellent hæmostat over the raw area of gland which it has been impossible to cover, but prevent that unhappy complication of a skin scar adherent to the trachea, with resultant tugging during swallowing. With this technique we are able to close all our cases without drainage. There is no separate suture of the platysma, the skin being closed by clips alone. These are removed at the end of 72 hours.

POST-OPERATIVE CARE

We have been standardizing the immediate post-operative management of these patients. Every patient on being returned to bed is given an intravenous injection of 10 per cent glucose in saline by the continuous drip method, which has been popularized by one of my associates, Dr. R. I. Harris.[19] In this way we give 3000 c.c. of fluid intravenously at the rate of 70 to 100 drops a minute. Also, we give per rectum 45 minims of Lugol's iodine solution and ½ oz. of paraldehyde. During the subsequent days in hospital, Lugol's solution, 10 minims three times a day, is administered by mouth.

One must be constantly on the alert for the initial signs of an impending crisis. I am convinced that the incidence of post-operative thyroid crises is the best indication of the judgment of the individual surgeon. With increasing experience, these reach almost the vanishing point. Restlessness is the most valuable single sign of an impending crisis, and, when combined with a rising temperature and pulse rate, calls for immediate action. If coupled with vomiting or diarrhœa, one has a definitely established hyperthyroid storm.

The management of a hyperthyroid crisis is

dependent upon three main procedures—the administration of fluids, sedatives and iodine. The most universally employed sedative is morphia, and this will control most cases, but must be given in relatively large doses, starting with ¼ grain and repeating in two hours if no result is obtained. In certain instances morphia excites, rather than soothes, the patient. In such cases we have given paraldehyde, one ounce in two ounces of liquid paraffin per rectum. If this fails, 2 c.cm. of paraldehyde in 10 c.ccm. of normal saline may be given intravenously, repeated in four to six hours. A recent case continued to be restless, despite the above procedures, and 6 grains of amytal were given intravenously. This was followed by six hours' sleep. Our experience with amytal is as yet too limited to speak with any authority, but the cases in which we have used it lead us to hope that we have a new drug with which to control the restlessness of a hyperthyroid crisis. If the patient is not vomiting, Lugol's solution is given by the mouth, 10 minims every ten minutes for six doses. If after this the restlessness is uncontrolled, 5 c.cm. of a 10 per cent solution of sodium iodide are given intravenously. All our patients are digitalized prior to operation, hence the wisdom of administering strophanthus becomes debatable. However, I am perfectly convinced that the administration of 1/125 of a gram of strophanthus intravenously in a desperate situation has turned the scales in favour of the patient on more than one occasion. However, the counsel of a cardiologist is invaluable in the use of this drug. One is interested by the suggestion made by Rogers[17] that the administration of thyroxin is beneficial in hyperthyroid crises. We have had no experience with this procedure.

POST-OPERATIVE COMPLICATIONS

In regard to post-operative complications, hæmorrhage and post-operative respiratory obstruction are most to be feared. Even in the hands of the most experienced operators, post-operative hæmorrhage will occasionally occur, and this fact has been used as an argument in favour of routine drainage. While fortunately our experience with post-operative hæmorrhage has been very limited, we have never had any difficulty in diagnosing its presence in the absence of wound drainage. Our nurses are cautioned to watch for any alteration in the contour of the neck and any evidence of increased difficulty of inspiration. The treatment, of course, is obvious; the wound must be reopened immediately.

Respiratory obstruction presents a more complicated problem. In my early association with thyroid disease I was led to believe that collapse of the trachea after removal of a large gland was a very real occurrence. I now believe that such is entirely a myth. Prolonged respiratory obstruction, *i.e.*, excluding the temporary obstruction associated with the delivery of a large intrathoracic adenoma, is due to an injury to a recurrent laryngeal nerve. A type of obstruction has been noted occurring 26 to 30 hours after operation and becoming alarming in three or four hours after the onset of the respiratory difficulty. Laryngoscopic examination shows the cords held in adduction, with a very narrow slit between them. We have concluded that this is due to œdema which has involved and produced a temporary interruption of the conductivity of the recurrent laryngeal nerve. We have seen two such cases with complete recovery of the patients. While post-operative respiratory obstruction of any kind is very rare with a careful operative technique, yet it does occur. I am impressed with the value of an immediate tracheotomy for the relief of respiratory obstruction in order to save a badly involved cardiovascular system. The extra work placed upon the cardiovascular system by the occurrence of respiratory obstruction is sufficient in some instances to change an otherwise satisfactory convalescence into a fatality. Furthermore, in our limited experience, tracheotomy has been followed by nothing but the happiest results. We have had no severe infections, and the worst complication that has occurred has been a scar adherent to the trachea. This can readily be corrected after the wound is well healed.

Tetany occurring shortly after operation is transient, and probably due to an interference with the blood supply of the parathyroids by œdema. The intravenous injection of 5 c.cm. of a 10 per cent solution of calcium chloride is sufficient to immediately control this. On one occasion some of the calcium chloride solu-

tion escaped into the tissue surrounding the vein. We immediately excised this area and avoided an extensive necrosis. Since this time we have been putting 0.5 gram of calcium chloride in 125 c.c. of normal saline. With this solution, sufficient calcium is administered without too great dilution, and if by chance some should escape into the tissues around the vein, it is not sufficiently concentrated to produce a slough. I have had only one case in which it has been necessary to resort to Collip's parahormone. This case developed tetany eight weeks after operation, and required the administration of large doses of calcium daily and Collip's parahormone twice a week for four years. At the end of this time she developed a tolerance to a low serum calcium, and for three years now has been very well. In our experience the oral administration of calcium lactate has been much less efficient than that of calcium chloride. We give patients with latent tetany a basal protein diet, at least a quart of milk, one pound of lactose daily, and high vegetable content in their diet. A suggestion which has been made, that strontium lactate administered per os prevents the loss of calcium through the gastrointestinal tract, is interesting. We have had no opportunity as yet to verify this statement.

When the patients leave the hospital following a resection of the thyroid for thyroid intoxication, their conduct for the subsequent six months determines their future. We insist that following operation they spend the first month in bed, the second month lying down 18 hours out of 24, and the third month in bed 12 hours, with short walks and drives. Absolutely no responsibility of any kind is permitted for three months. In the subsequent three months a minimum of responsibility is assumed, with no extra social duties. After such a sojourn in bed, it is extremely important that these patients do not use bedroom slippers on attempting to walk, but that they should wear a stout shoe which will support the arch and prevent painful flat feet. Should a patient suffer from persistent auricular fibrillation after resection of the gland, the administration of quinidine by a cardiologist is indicated.

SUMMARY

1. Thyroid intoxication is a metabolic disease involving the whole organism, the thyroid dysfunction playing a predominant part.

2. Iodine should never be used in thyroid intoxication except during the pre- and post-operative management. It never cures hyperthyroidism.

3. In frank thyroid intoxication, radical resection of the thyroid gland is the therapy of choice. This will remain so until we have more accurate knowledge of the underlying etiological factors.

4. Patients suffering from a cardiovascular disability and a nodular thyroid should have a resection of the thyroid gland, even in the presence of a normal basal metabolic rate.

5. Thyrotoxic patients under twenty years of age present a difficult clinical problem. If the symptoms develop with a persistent adolescent enlargement of the thyroid, the prognosis is doubtful as far as freedom from morbidity is concerned. Radiation is useful in this group. Operation, while occasionally necessary to save further cardiovascular damage, is attended with much greater risk than in patients a decade older, and should only be considered when rest and drugs, with removal of all foci of infection, have proved inefficient.

6. If thyroid intoxication occurs during pregnancy, treat the hyperthyroidism without considering the pregnancy.

7. All nodules in the thyroid are potentially dangerous, and, if persisting after twenty-five years of age, should be resected.

8. A pre-operative preparation characterized by attention to the most minute detail is essential to the successful management of thyrotoxic patients.

9. A prolonged, carefully supervised convalescence is essential to secure the maximum improvement from treatment.

10. In patients suffering from a thyrocardiac disturbance one never despairs of being able to secure relief. In this disease it is possible to operate in order to cure heart failure.

11. Team work, and eternal vigilance in the attention given to every detail, are essential to a low mortality and a minimum morbidity.

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SCLEROSIS AND OCCLUSION OF THE CORONARY ARTERIES*

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ALTHOUGH sclerosis of the arteries is of the greatest antiquity, existing in the Egyptian of the eighteenth dynasty, thirty-five hundred years ago, in much the same fashion as it does in us to-day, it is only within comparatively modern times that the relationship of changes in the coronary arteries to myocardial disease has been apprehended. Peculiarly frequent amongst the physicians of many races and generations, lesions of the coronary arteries have destroyed some of the finest of their lineage. Morgagni, Panum, Hunter, Charcot, Nothnagel, Pepper, and James Mackenzie, each met his death from this disease—the last mentioned, one who had done so much in the course of an arduous country practice to interpret the functional consequences of its progression. While cardiac rupture, occurring as a result of a coronary lesion, was known to William Harvey, the first observations on coronary sclerosis have been attributed to Drelincourt, Thebesius and Bellini, at the beginning of the eighteenth century. The appreciation of the clinical and functional significance of calcareous deposits in the walls of the coronary arteries commenced in the careful observations and deductive reasoning of Jenner, Parry, and Baillie, following whose time many observers have interpreted their effects and emphasized their importance.

It is neither necessary nor possible at this time to review the growth of our knowledge concerning sclerosis and occlusion of the coronary arteries. Amongst many communications in the literature some remain of paramount importance, the moulds of our present thought. Weigert's[1] description of myocardial infarction, published in 1880, and recognized in its corresponding relation to infarction in other organs, is a classic of accurate observation in pathology. The following year, the work of Cohnheim and Schulthess-Rechberg[2] upon the effects of ligation of the coronary arteries in dogs suggested that the distribution of each of these vessels was virtually that of an end artery, since there seemed to be no collateral assumption of function following their occlusion. Their results coincided with the early notation of Panum that coronary obstruction was followed by the death of the animal. These observations were later extended and modified by Kolster, by Frey, and by Porter, who found that death did not necessarily follow the occlusion of the vessel lumen. Hirsch and Spalteholz[3] demonstrated the existence of an arterial anastomosis between the coronary vessels, and showed by ligation experiments that the infarction did not include the entire area supplied by the ligated vessel. Their observations were confirmed and extended by Miller and Matthews. The work of Kolster, and of Karsner and Dwyer, clearly delineated the course of infarction in the experimental animal, and with the anatomical-physiological experiments of Smith, and the pathological observations of Wearn,

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proved that occlusion of a main coronary arterial branch could be survived. Of late years, while we need not deny the functional concept of the coronary vessel as an end-artery, this controversial point has become of less importance, in view of the demonstration by Oberhelman and LeCount, and by Gross,[4] of the amount of variation in the collateral distribution of the arteries in man. The extent of the arterial anastomosis varies from species to species, from man to man, from age to age, and from health to disease. If the lesion encroaching upon the lumen of the vessel be but a slowly progressive one, a considerable degree of compensatory anastomosis from adjacent vessels may be developed. The stage of myocardial infarction has been well described by Ziegler under the term "myomalacia cordis." The relationship of myocardial ischæmic necrosis to coronary occlusion was soon confirmed by a number of writers, notably Samuelson, Huber, Leyden, Steven and Krehl.

The additions to our clinical knowledge of coronary occlusion have come mostly in recent years. The recognition in 1910 of the clinical features of the disease, confirmed by autopsy findings, is due to the acuity of observation on the part of the Russian observers Obrostzow and Straschesko.[5] It is interesting to note that Osler,[6] in his Lumleian Lectures of that year, remarked that "blocking of a branch with a fresh thrombus is very common in cases of sudden death in angina". The findings of Obrostzow and Straschesko were confirmed the following year by Hochhaus.

It is important to recall that in the United States, as early as 1896, Dock had reported a case of myomalacia cordis in which the antemortem diagnosis was confirmed at autopsy. During the past fifteen years the additions to our knowledge of coronary disease have come largely from American writers, who have added materially to our conceptions of the clinical features of the condition and its accompanying functional derangements. Notable amongst these are Herrick, Levine, Gorham, Smith, Pardee, Libman, Willius, Paullin, Longcope, Thayer, Wearn, Gordinier, Christian, Faulkner, Wolff, White, and Hamman, and others. Benson's[7] review of the literature previous to 1926 has given us a comprehensive analysis of the subject.

The coronary arteries arise abruptly, as arteries of the muscular type from the elastic aorta, and are subject to the high pressures present in the first portion of the aorta. The coronary arteries possess a relatively greater amount of musculature in their media, and are better supported by their internal and external elastic laminæ than are vessels of equal size in other organs. The right-angled manner of origin of the branches of the left coronary is a peculiarity worthy of note.

The coronary arteries arise abruptly, as lesions, which, although differing from each other, may be classified under the general term of arteriosclerosis. The quality of these lesions and their importance in subsequently bringing about functional damage of the vascular structure differ very greatly and make their appearance at widely different age periods.

It has been noted by different authors, and particularly commented upon by Mönckeberg, and subsequently by MacLean, that the earliest signs of sclerosing lesions may appear in the first and second years of life, and then present themselves in increasing frequency with advancing age. These earliest lesions, consisting of superficial fatty plaques, primary endarteritis, or rheumatic periarteritis, may have no immediate effect upon the coronary circulation, but they represent the beginning of changes which, with recurrent additions, or with secondary processes localizing upon the primary lesion, may give rise to serious distortions and disablement of the vascular function as is recognized in chronic disease. The best example of such a progressive lesion is seen in the simple and harmless superficial fatty streak which appears so early in life, and which reappears at all ages in association with acute infections and acute intoxications.

Considerable study has been given to these fatty deposits in the intima, and the common type has been reproduced in a limited number of arteries in animals by the feeding of food rich in fat and cholesterol, or the introduction of these substances parenterally, which leads to a hypercholesterolæmia, along with deposits of cholesterol esters in the intima of arteries. These fatty substances are laid down in the structure of the intima by the phagocytic activity of specially adapted mononuclear phagocytes. Little or no fat lies outside of

these cells, but in the subsequent history of the lesion with the definite degeneration of these phagocytes, the fat comes to lie free and some of it seeps into the collagen of the elastic and connective-tissue fibrils. At the same time it is noted that the overgrowth of the subendothelial connective tissue takes place to produce a plaque over the surface of the original fatty deposit. This is the beginning of an atheromatous structure associated with the ever-present chronic endarteritis.

We have also encountered another lesion which in its end-result resembles closely the preceding, but which has a different beginning. In young children we have met with a primary proliferative and reactionary lesion in the intima of the coronary and other arteries. This lesion at its onset consists of a localized inflammatory œdema of the intima with lymphocytes, plasma cells and occasional polymorphonuclears, occupying the loose subendothelial stroma and rapidly showing the presence of proliferating fibroblasts, so that in a short time, a small local nodule is produced. The lesion becomes quiescent, but lymphocytes pervade the reaction for a long period. It would appear from the nature of the lesion, as studied in young adults, that the early nodules are subject to exacerbation, with reaction and proliferation, on subsequent occasions of similar infections. They resemble the so-called allergic reactions described in relation to the mitral valves. With succeeding recurrences the nodules increase in their bulk, developing a more massive inflammatory structure within the intima, until a definite and permanent nodule projects into the lumen of the vessel. These primary inflammatory nodules represent true types of endarteritis, in which, when the nodule has become sufficiently large and dense, a secondary process of degeneration involves the deep layer close to the media in fatty and other degeneration. It is, therefore, our belief that the atheroma, with its accompanying plaque-like endarteritis, may have its beginning either in a primary fatty degeneration as seen in the fatty streaks, or in a primary endarteritis as is found accompanying some of the acute infectious diseases of childhood.

During the first and second decades of life the lesions affecting the intima of the arteries are usually of a simple type and are quite small, not materially encroaching upon the lumen. In the fourth decade the lesions occur with increasing frequency and rapidly become more prominent, forming definite projecting nodules which may interfere with the free circulation in the vessels. At this period of life it is difficult to indicate the manner of origin of the arterial lesions, for usually the disease leading to death has had no relation to the development of the endarteritis or the atheroma involving the vessel wall. The left coronary artery is affected more frequently and more intensely than the right, and in studying the earliest lesions appearing in the coronary arteries it is noted that they are prone to arise in the left anterior descending branch.

The nodular endarteritis appearing in the coronary artery bears a close resemblance to the analogous lesion arising in the aorta. It is noted, however, that the thickened intimal plaque projecting into the lumen and outwardly pressing upon the media has greater influence in bringing about atrophic changes in the muscular coat than is seen in the aorta. It is almost universally true that the endarteritic nodule of the coronary artery is associated with a secondary narrowing of the media opposite to its location. This atrophy of the muscular tissues leads to a thinning of the coat, frequently to less than one-half of its normal diameter. Reactionary processes, either in the media or in the adventitia, are usually absent, and there is no compensatory growth of fibres in these layers. Only rarely is there evidence of a more rapid degenerative process in the media wherein secondary products, such as calcium, are laid down in the injured structure.

On the other hand, it is evident that once a nodular lesion has developed in the intima, it tends to progressively enlarge and further encroach upon the lumen of the vessel. This progressive enlargement is accomplished in part through the proliferation of the overlying tissues in the character of a chronic endarteritis, together with an increase in deposition of the fatty materials constituting the deep atheroma. The fatty process is found to involve the tissues of the endarteritic thickening along with the mononuclear phagocytes, muscle and elastic fibres of the neighbourhood. A considerable quantity of the fat lies free and the inert collagen and elastic substances are

impregnated with lipoid materials. The total quantity of fat appearing in such an area is much greater than the contained fat of the original tissues. The larger proportion of this material has been brought to the area by the blood fluids and it has found its way into the cells of the damaged area. The manner in which this fatty material localizes in the atheromatous structure is not clear, although some believe that it passes through the interstices of the arterial structures, either in relation to the normal lymph or by being extruded by mechanical means from the lumen of the vessel.

It is probable that the continued enlargement of the endarteritic nodule is the outcome of recurrent attacks of the original process which brought it about. In the coronary arteries the lesion retains its superficial covering of laminated intimal tissues, and seldom do we note a break in the continuity such as is seen in the aortic atheromatous ulcerations. With the progressive accumulation of lipoid materials, calcium salts are also deposited within the affected area, and the intimal lesion extends laterally so that it completely surrounds the lumen of the vessel. The calcareous deposit forms a hard mass replacing the atheromatous substances, and with it the lumen is greatly narrowed.

Even with the marked extension of the lesion so that the intimal process forms a complete band on the inner border of the artery the lesion remains confined to the intima, save for the secondary atrophic processes developing in the media. The internal elastic lamina which bounds the inner border of the media usually is itself involved in the atheromatous process. With the extension of the local lesion, the covering layer of the intima continues to proliferate to maintain an intact lumen. This continued proliferation leads to a definite narrowing and threatens to disturb the circulation to a degree inviting thrombosis. The narrowed lumen creates an obstruction to the circulation through the artery and causes numerous eddies and whirlpools in the dilated portion of the artery immediately beyond the obstruction. Moreover, at the point of coronary sclerosis the arterial wall is far from healthy, and the surface membrane which suffers the effect of an increased velocity eventually may show evidence of injury. These areas of endarteritis and atheroma are the regions where thrombosis is prone to occur, and careful study of the sclerosed vessels in cases of fatal coronary disease will show the presence of complete or partially occluding thrombosis at these points.

Nodular endarteritis and atheroma are the outstanding lesions of coronary sclerosis. The other forms of arteriosclerosis are quite infrequent and of less importance. It is true that acute rheumatic fever brings with it perivascular lesions of the finer divisions of the coronary vessels of the heart, but under these circumstances the damage involves the myocardial structures themselves rather than the arterioles.

Occlusion of a coronary artery may be the result of an embolus lodged in its lumen, of thrombosis associated with the lesions in the vessel wall, of periarteritis nodosa, and thrombo-angiitis obliterans, or of the obliteration of its aortic orifice by a syphilitic or atheromatous process in the sinus of Valsalva. Apart from these obliterating processes obstructing the coronary artery, there are other stenosing processes involving these vessels which, because of their frequent occurrence, are more important in this study. The slowly progressive coronary stenosis is usually the result of an endarteritis with its accompanying deposition of calcium salts in an atheromatous plaque, which, steadily encroaching upon the vessel lumen, finally accomplishes its obstruction. The sequence of events in such a coronary artery is clear —chronic nodular endarteritis, atheroma, coronary stenosis. Some writers would hesitate to assign a place to the process of coronary thrombosis in the above series of arterial changes. Venous thrombosis is known to occur at times upon vessel walls which show no appreciable or only a minimal lesion. Is this true of the occurrence of thrombosis in the coronary arteries, or is the presence of the thrombus in these vessels associated with distinctive lesions of the arterial wall?

With the solution of this question in mind, 44 cases of coronary disease which had been met with on the autopsy service during the past four years have been reviewed. In this series, 26 cases comprised a group presenting advanced lesions of coronary sclerosis of a degree suffi-

ciently marked as to be classified as coronary stenosis. The remaining 18 represented a series in which a thrombus had been found lodged in a coronary artery. A comparative study was made of the features, clinical and pathological, exemplified in these two groups of coronary disease. The following tables represent a comparative analysis of the incidence of the clinical and pathological features in the two series of cases.

TABLE 1

COMPARISON OF CLINICAL FEATURES

Relation of	*Coronary Sclerosis (marked)*	*Coronary Thrombosis*
Average age	58.9 years	55.4 years
Sex	88.5% males	100% males
Presence of angina pectoris	64.7%	70%
Average duration of angina pectoris	30 months	44 months
Presence of arterial hypertension	61%	62%
Average systolic blood pressure	156 mm. Hg.	171 mm. Hg.
Occurrence of auricular fibrillation	23%	14%
Average duration of clinical symptoms	30 months	39 months
Incidence of positive Wassermann test	11.5%	11%
Incidence of diabetes mellitus	20%	?

TABLE II

COMPARISON OF PATHOLOGICAL FEATURES

Relation of	*Coronary Sclerosis (marked) Percentage*	*Coronary Thrombosis Percentage*
Chronic nodular endarteritis	100	100
Atheroma	100	100
Multiple coronary arterial lesions	100	89
Most marked lesions in left descending branch	55	65
Most marked lesions in left coronary excepting descending branch	19	12
Most marked lesions in right coronary artery	26	23
Myocardial infarction	15	72
Myocardial fibrosis	88	88
Myocardial hypertrophy	92	94
Myocardial dilatation	69	83
Chronic sclerotic endocarditis	54	61
Recent thrombosis in heart cavity	0	30
Aneurysm of heart	17	17
Syphilitic aortitis	11.5	11

After a study of the above table certain points attain significance in our minds. The average age incidence in the two disease groups is approximately the same. In the series of individual dying of coronary thrombosis, considered in this study, all have been men. Although the disease is several times more common in men than in women, its uniform occurrence in males in this series is, of course, accidental. The incidence of 88.5 per cent of men in the coronary sclerosis group offers a fair average of the incidence in both conditions. The frequency of angina pectoris in 60 to 70 per cent of both groups of patients is a relative fact of considerable significance. The duration of clinical symptoms and the average time during which the patient had suffered from anginal attacks may be observed to be definitely longer in the group of coronary thromboses. Arterial hypertension occurred equally in 61 per cent of both clinical groups, and there was no significant difference in the average systolic blood pressure in the two series of patients. Auricular fibrillation was noted somewhat more commonly in the group of coronary scleroses. A positive Wassermann reaction has been recorded in 11 per cent of cases in both series. Diabetes mellitus was an associated condition in a rather high proportion of the patients dying with coronary sclerosis, but insufficient data were available to compute its incidence in the other group.

Of the pathological features observed in the two disease groups, the lesions of chronic nodular endarteritis and atheroma were of constant occurrence in each series. A multiplicity of coronary arterial lesions was present in all cases of sclerosis of the vessel, and its incidence was almost the rule in the coronary thrombosis group. Inspection of the record of the site of occurrence of the lesions in the coronary arterial system reveals a remarkable correspondence in the two series of cases. An old myocardial infarction, related to a past occlusion, was present in 15 per cent of the cases presenting coronary sclerosis at autopsy, but reasonably occurred in most cases of coronary thrombosis. Many persons dying with the latter condition succumbed before a recognizable infarct could develop. Both hypertrophy and fibrosis of the heart muscle were of equal frequency in the large majority of cases of the two disease groups. Myocardial dilatation was, with reason, somewhat more common in those patients suffering the terminal injury of a coronary thrombosis. Chronic sclerotic endocarditis was an associated lesion in over half the individuals in each group. Recent thrombosis of the endocardium was present in 30 per cent of the cases of coronary thrombosis as a sequence to an infarction extending to the inner lining of the cardiac

cavity. Aneurysm of the heart, indicative of past coronary occlusion, occurred alike in 17 per cent of both series of cases. Syphilitic aortitis was of equal incidence in the two groups of individuals, occurring in 11 per cent of each series.

The inference, which may reasonably be deduced from the study of these tables is that in most instances coronary sclerosis and coronary thrombosis are the same disease. Longcope and Libman have maintained that coronary thrombosis can occur without a preceding sclerotic change of the vessel wall. Admitting the existence of such cases, their occurrence must indeed be uncommon. There is no significant difference between the two conditions, either in the preceding clinical associations, or in the findings at post-mortem examination. They differ only in the specific effects associated with the final sudden occlusion of the vessel by the thrombus. Myocardial infarction and thrombosis of the ventricular cavity are much more frequently encountered as a result of coronary thrombosis. Thrombosis in the arteries is an event which is to be expected as the last link in a chain of arterial lesions in the history of the arterial wall—chronic nodular endarteritis, atheroma, thrombosis.

The sclerotic changes in the coronary arteries influence the function of the artery itself, or affect indirectly, through depressed nutrition, the myocardium. Which effect it may be that leads to clinical manifestations is as yet impossible to state. Whether the clinical symptoms be vascular in origin, as a result of disturbance of the muscular control of the coronary circulation induced by local atrophic processes at the point of sclerosis, or in consequence of interference with the rhythmic peristalsis of the arterial wall, or whether they are related only to the resulting ischæmia and concurrent anoxæmia of heart muscle, present knowledge does not permit us to say. We possess an analogy in the pathological processes of Raynaud's disease and Buerger's disease, in which recurrent spasms of pain constitute an important part of the clinical picture. But, nevertheless, in each of these conditions we are unable to dissociate the effect of the sclerosis upon the muscle tissues from the evidence of a purely local arterial damage.

We have on repeated occasions noted the effect of the interference of the coronary circulation upon the myocardium, and have observed the presence of extensive plaques of myocardial fibrosis in individuals who, during their lifetime, have never shown evidence of cardiac distress. In others again, where the fatal thrombosis has led to an earlier and rapid death, the amount of old myocardial change has not been great, although symptoms of cardiac embarrassment were present for months prior to death. Between these two extremes, many gradations of lesions and a diversity of combinations of vascular scleroses, myocardial fibroses, and clinical evidences of angina pectoris have been encountered. We have found that observations conducted solely upon any one of these features offer no criteria as to the extent of the others. Interpreting this in terms of the coronary artery, we may say that an analysis of the sclerotic and stenosing process in either coronary artery will not necessarily reveal a parallel degree of damage in the myocardium. An important feature to bear in mind is that the scleroses of the coronary artery are prone to be multiple, and that we encounter endarteritis and atheroma along the several branches of both coronary vessels. In the event that the scleroses involve both right and left coronary arteries, or their branches, in such a manner and to such a degree that an anastomotic circulation cannot be established for the obstructed vessel, myocardial damage is the certain sequel. If this circulatory interference is so great as to lead to complete local anæmia necrosis will supervene and replacement fibrosis occur.

Here, again, we must call attention to the wide variation in the quantitative anæmia which may affect the muscle tissue. It may be diffuse, involving the larger part of one ventricle, or it may pick out certain areas in patches, areas representing the capillary bed related to a given sclerosed coronary branch. The slowly progressive arterial lesions, when they affect the myocardium, give rise to fatty degeneration, which not uncommonly is seen in the papillary muscles in the early stages. We have, however, observed a diffuse fatty degeneration of the inner third of the left ventricular wall in cases of stenosing sclerosis of the descending branch of the left coronary, associated with a progressive sclerosis of the right coronary. Under these conditions the want of an adequate anastomotic circulation from the right coronary has made

itself felt first in the lesser capillary bed of the inner third of the myocardial wall, in which the reduced volume of blood from the left descending branch has been insufficient to maintain healthy myocardial fibres. In other words, the influence of an impaired coronary circulation is not equally felt in all portions of the ventricular wall. In the further progress of the degenerative processes a similar variation in the distribution of the lesions is noted.

These findings are compatible with the reports of others. In the majority of advanced cardiac processes resulting from coronary sclerosis, such as aneurysm of the left ventricle, we can often demonstrate lesions in various stages of development, from recent myocardial fatty degeneration to the late and mature fibroses. This is also in keeping with the findings in the arteries. In their multiple lesions, different grades of development may be demonstrated, and varying degrees of occlusion are encountered. Each of these intimal scleroses is a progressive lesion, and does not remain stationary; one by one, the small arterioles become distorted and their lumina narrowed until their capillary beds suffer partial anæmia. According to the degree of this anæmia, degeneration follows. Patches of degeneration and scattered areas of fibrosis are the obvious result. As each patch comes into prominence, the reserve of the ventricular wall is impaired, and the muscular tissue remaining assumes a greater burden. May not these patches of degeneration, with their attendant autolytic products, influence the myocardial properties of contractility, tonicity, rhythm, irritability, and conductivity? At all events the sequence leads inevitably to fatigue, often to the wane of compensation.

SUMMARY

Coronary disease of the heart usually affects adult males between the ages of 55 and 60 rarely before 30, and is the outcome of an endarteritis associated with atheroma and calcification. The arteriosclerotic process brings about a stenosis of the vessel, but the complete occlusion results from thrombosis. We have encountered no case in which thrombosis developed in the absence of sclerotic arteries. The sclerotic patches in the arteries are multiple, various branches of the right and left coronary being involved at the same time. The presence of stenosing endarteritis in both right and left coronary arteries enhances the myocardial damage which results from nutritional disturbances. A unilateral stenosing endarteritis may progress to a considerable degree without causing myocardial damage or cardiac manifestations. If the developing stenosis progresses slowly, the anastomotic circulation between the right and left coronaries compensates for the vascular derangement, when one coronary alone is seriously affected. Rapidly occluding processes as obtained in thrombosis induce more serious myocardial disturbances than the slowly progressive and compensating stenoses associated with chronic endarteritis.

The stenosing arteriosclerosis appears to have its beginning either in a primary endarteritis or in an intimal degeneration followed by endarteritis. Although rheumatic lesions of the arteries may play a part in the origin of the sclerosis, we were unable to demonstrate this association in our specimens. Nor were we able to demonstrate a direct relation between syphilis and coronary sclerosis. Furthermore, in this discussion we are not including the stenoses arising at the aortic entrance to the coronary arteries resulting from syphilitic aortitis. The manner of distribution of the scleroses does not support the contention that the arterial lesions are the result of mechanical stresses due to unique branching of the coronary arterial system.

The factors in the causation of endarteritis and atheroma of the coronary arteries are still undetermined.

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CORONARY THROMBOSIS*

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MEDICAL history of the future doubtless will record as one of the important contributions to clinical medicine of the past twenty years the general recognition of coronary thrombosis. True, the condition has been known to pathologists and to clinicians for many years past, but one finds prior to about fifteen or twenty years ago only one systematic account of the clinical picture of this disease,—at least in sufficient detail to enable one to make a bedside diagnosis. This pioneer contribution by Von Leyden was published in the *Zeitschrift für klinische Medizin* in 1884, under the title "Ueber die Sclerose der Coronararterien und die davon abhängigen Krankheitszustände." Here appears an excellent account of the clinical symptoms of coronary occlusion, but unfortunately it received no general recognition until the subject was again revived some thirty years later.

To substantiate his contention that angina pectoris was due to coronary arteriosclerosis, that astute French clinician Huchard, in 1905, published the records of 185 autopsies on patients who had during life Heberden's angina. Huchard mentions all the cardinal signs and symptoms that we now associate with coronary occlusion, as well as the cardiac infarction, aneurysm of the ventricles, rupture of the heart, etc. There is, however, no indication that Huchard made the *ante mortem* distinction between angina pectoris and coronary thrombosis. Similarly, Sir Wm. Osler, in his Lumleian lectures in 1910, stated that coronary thrombosis, pericarditis, aneurysm, and rupture of the heart were frequently found in patients dying of the severe form of angina pectoris. Even as late as 1924, in his book on angina pectoris there is nothing to indicate that Sir James Mackenzie had ever made the diagnosis of coronary thrombosis.

The past quarter of a century has witnessed a lively debate on the question of the anatomical basis of angina pectoris. Sir Clifford Allbutt, Wenckebach, and others, contended that the symptom-complex described by Heberden was due to pathological changes at the root of the aorta, while Huchard, Osler, Mackenzie, and their school believed that angina pectoris was due to myocardial ischæmia secondary to coronary arteriosclerosis. In this heated argument by the peers of our profession, many observations on coronary thrombosis are buried in the discussion of angina pectoris. Now that the smoke of battle has cleared away, a clinical picture of coronary thrombosis has been evolved, so characteristic that any informed clinician can readily recognize it in the majority of cases. To-day medical students are made familiar with the disease, not only as an interesting academic problem but also one of great practical importance. The early diagnosis and proper management of a case are imperative if the patient is to have the best opportunity to recover. Although some individuals die suddenly, others in a few hours or days, yet many recover and are able to lead quite active lives. I have in mind several patients, physicians and attorneys, who, one to four years after a coronary accident, are now doing as much intellectual work as before.

Vital statistics covering the past twenty-five years show that the chief barrier to longevity at present is heart disease. The commonest cause of heart failure beyond forty is hypertension. Indeed, high blood pressure leads to cardiac failure more frequently than is indicated by vital statistics, because many deaths at present reported as chronic myocarditis and chronic nephritis are in reality due to heart failure secondary to hypertension. Fahr estimates from the 1924 mortality statistics covering the registration area of the United States that more than 70,000 people beyond fifty years of age are dying annually of hypertensive heart disease.

A second important cause of heart death beyond forty is coronary disease. We may recall that the heart muscle receives its blood supply through the two coronary arteries which spring from the root of the aorta. The right coronary supplies chiefly the right ventricle, but also sends a branch to the posterior wall of the left ventricle, while the left coronary artery is

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distributed chiefly to the left ventricle, but supplies also a part of the anterior wall of the right ventricle. With advancing years the coronary arteries, like other vessels, become thickened and hardened from arteriosclerotic changes in their walls. The normal delicate intimal lining in contact with the blood is roughened and scarred, while the lumen of the vessel is often narrowed. Such changes may be widespread and involve both arteries throughout their course, or they may be confined to a small area of one vessel.

The question now arises—What is the functional significance of these anatomical changes? In other words, what evidence do we have that the heart is handicapped in its work by coronary arteriosclerosis? That advanced coronary disease is compatible with fairly good myocardial function is well known. For example, we frequently are surprised to see at autopsy an extensive sclerosis of coronary vessels that was clinically silent. Equally striking is the sudden death from coronary thrombosis of a man in the prime of life and with no previous symptoms of heart disease. Here the arteriosclerotic changes may be fairly well confined to a few millimetres of one artery, usually the left coronary. Furthermore, coronary occlusion and old healed infarcts of the myocardium are found in individuals who had no clinical signs of heart disease to the very end. It is clear, therefore, that the clinical picture in coronary arteriosclerosis varies widely. At one extreme, extensive disease apparently causes little interference with cardiac function; at the other, there may be acute circulatory collapse and sudden death.

Some persons will have anginal symptoms associated with exercise, a full stomach, emotion, or cold, antedating by months or years a fatal attack of coronary thrombosis. Again, another group of patients suffering from coronary disease develop more or less insidiously the picture of myocardial insufficiency, and run a progressive downhill course to death from circulatory failure.

To understand the diversity of the clinical picture seen in patients suffering from coronary disease, we must consider certain recently established facts pertaining to the heart's capacity to compensate for disturbances in the coronary blood supply. Suppose, for example, that the lumen of one coronary artery is narrowed near the mouth, resulting in an impaired circulation to a certain area of the heart wall. Necrosis of such an area may be, and frequently is, prevented by the establishment of a collateral circulation through anastomotic branches from the other coronary artery. That capillary communications between branches of the two coronary arteries occur in human hearts was demonstrated by Gross. In a large series of observations he found a certain relationship between age and coronary anastomosis; with advancing years the collateral circulation between the two coronary arteries becomes more elaborate, which suggests that a man of sixty is better prepared for a coronary accident than a man of forty. A still more important factor influencing compensation in coronary disease is the element of time. A sudden interruption of the blood supply through the main stem of one coronary artery may cause acute circulatory collapse, and often sudden death, whereas the same lesion developing gradually is accompanied by no symptoms. For example, syphilitic changes at the root of the aorta commonly lead to narrowing or to complete obliteration of the mouths of the coronary arteries, but the occluding process is a gradual one and no serious symptoms appear. As Oberhelman and Le Count have shown in such cases, an elaborate capillary anastomosis is developed between the two coronary arteries, which is usually adequate to prevent infarction of the heart muscle. I have seen three cases of syphilitic aortitis in which the mouths of both coronary arteries were completely blocked, with no evidence of myocardial infarction. Such hearts maintain a fairly adequate circulation for days, and in all probability for weeks or months, with no blood supply through the normal channels. With both coronaries blocked, the only source of blood supply to the heart muscle is through the Thebesian system of vessels, those tiny channels which communicate directly with the ventricular cavities. The true significance of these vessels was demonstrated recently by Wearn, who, in an ingenious set of experiments, showed a direct communication between the coronary arteries and the chambers of the heart through the Thebesian vessels. As Wearn mentions, the best evidence that the Thebesian vessels actually take over the function of the coronary arteries is supplied by observations on patients with complete obliteration of both coronaries from syphilis.

Thus we see that the functional significance of coronary disease leading to occlusion, depends on the heart's capacity to compensate for the lesion. This in turn is influenced by several factors, of which the most important appears to

be the element of time. A gradual narrowing of the coronary lumen may cause no symptoms, because ample time is afforded for the development of collateral channels, whereas a sudden block, as happens in thrombosis, may lead to serious results—infarction of the myocardium, or sudden death. Besides the time element, we have other factors: such as (1) the calibre of the occluded vessel; the larger the artery the greater will be the area of myocardium deprived of blood supply; (2) the extent of anastomosis between the two coronaries existing at the time of the occlusion; and (3) the condition of the heart muscle; a myocardium damaged from rheumatic infection or previous coronary disease, or one partially exhausted from prolonged hypertension, is less likely to tolerate a coronary accident than a relatively sound muscle.

Such are some of the known factors to be considered in cases of coronary disease. It is not remarkable, therefore, that the clinical picture should vary in different patients, or that advanced coronary disease should be found at autopsy in individuals who had during life no signs of heart disease.

General Remarks on Diagnosis

The usual case of coronary thrombosis presents a fairly typical symptom complex so that little difficulty is experienced in establishing a correct diagnosis.

When a man beyond forty and in his usual health is seized with a severe attack of substernal pain, which is accompanied by shock, circulatory collapse and dyspnœa, we may assume that something definite has happened in the heart. If the patient dies in a few minutes, we may be reasonably sure that he has had a circulatory accident—most likely coronary thrombosis. Indeed, more than 90 per cent of all persons dying suddenly, that is within five to ten minutes from the time they considered themselves in their customary health, will show at autopsy a cardiac lesion, coronary disease and thrombosis, or rupture of the heart at the site of an old or recent infarct. In a few cases a ruptured aorta is found. Very rarely does cerebral hæmorrhage kill in a few minutes. In spite of these well established facts we still find such erroneous diagnoses as "acute indigestion" or "ptomaine poisoning" given as the cause of sudden death.

The fatal circulatory collapse in coronary thrombosis is due to ventricular fibrillation from sudden ischæmia of the heart muscle. Such cases are of little clinical interest as they are usually dead when seen by the physician. One sees a few instances in which an accurate diagnosis is important from a medico-legal standpoint.

Sudden Onset With Anginal Pain and Circulatory Collapse

Under this heading come the majority of cases of coronary thrombosis that survive the initial attack. The patient, usually a male beyond forty, is seized with an acute pain in the chest, more frequently under the sternum. In more than half the cases, the pain is not definitely precipitated by exertion but appears during sleep or while the patient is resting after a meal. Shortly after the onset one finds striking signs of shock and circulatory collapse; ashen cyanosis, cold perspiration, rapid, thready pulse, low blood pressure, feeble heart sounds and some degree of dyspnœa. Flatulence, and slight nausea are often observed. The cardiac mechanism frequently remains normal, although irregularities due to extra systoles or auricular fibrillation are sometimes seen. Moisture at the bases of the lungs and a swollen tender liver are common as early signs of congestive heart failure.

Clinical Course

This varies widely. The patient may not recover from shock and may die within an hour or two after the attack. He may rally temporarily and then die suddenly. In some instances the signs of congestion with œdema and hydrothorax may gradually increase over a period of days or weeks and death result from progressive circulatory failure.

If he survives for 24 to 36 hours, the patient usually has a moderate elevation in temperature (99°to 103° F.) for several days, accompanied by leucocytosis. During this period a pericardial friction rub may be heard for a few hours only, in some cases; in others it may persist for several days. If the signs of marked congestive failure do not appear, the patient usually has a slow convalescence with a return of the blood pressure to or near to normal, the heart sounds improve, and a careful physical examination may reveal nothing unusual. However, the electrocardiogram, both at this stage and as early as a few hours after the initial seizure, may give clear evidence of a coronary accident.

ABDOMINAL SYMPTOMS IN CORONARY THROMBOSIS

We may now turn to the atypical cases of coronary thrombosis in which the clinical picture suggests an acute surgical condition in the abdomen. The earlier medical writers, not recognizing coronary occlusion as a distinct entity, described such cases as abdominal angina. They were known to Heberden, and Butler in his book published in 1791, entitled "On the Disease commonly called Angina Pectoris," says that the pain, although usually mid-sternal, may arise occasionally in the pit of the stomach. Potain used the term "Angina sub-diaphragmatica," Huchard and Neusser, "Angina pseudogastralgica," the late Sir Clifford Allbutt, "Epigastric Angina." It is, therefore, no recent observation that heart disease may cause acute abdominal symptoms.

How often we have heard, and indeed still hear, of individuals dying suddenly of "acute indigestion." A patient in his customary health eats a hearty meal and shortly after, while resting perhaps, is seized with an agonizing pain in the pit of the stomach. A physician is called who finds his patient in collapse, complaining of flatulence or perhaps nausea and vomiting. Death seems imminent, and indeed may occur before any form of treatment may be administered. Such a case presents no particular diagnostic problem and at autopsy one usually finds a fresh thrombus occluding the lumen of the coronary artery. On the other hand, there is a small group of patients who survive the initial attack of pain and who develop acute abdominal symptoms, *i.e.*, acute pain and tenderness, usually in the upper abdomen, rigidity, nausea, vomiting, jaundice, fever and leucocytosis. This picture obviously presents a difficult diagnostic problem and one calling for a solution as soon as possible, since such surgical lesions as acute intestinal obstruction, perforated gastric and duodenal ulcer, acute pancreatitis, acute appendicitis, gallstone colic, must be considered.

If the question of heart disease is under consideration, it is important to have in mind the following facts:

(1) Coronary thrombosis has as an anatomical basis—coronary arteriosclerosis.

(2) Coronary arteriosclerosis is associated with the ageing process; it is unusual under 40 years of age; most cases are beyond 50.

(3) Coronary arteriosclerosis is about four times as common in men as in women. It is a rare disease in women under 50.

Therefore, in doubtful cases, particular attention is paid to the cardiovascular system. The history of high blood pressure, breathlessness on exertion, tightness in the chest, anginal pain, previous attacks of indigestion, is carefully scrutinized. Distant heart sounds, a gallop rhythm, the pulsus alternans, a disturbance in the cardiac mechanism, such as extra systoles, auricular fibrillation, a low blood pressure, and feeble precordial impulse are important objective findings. The presence of a pericardial friction rub will settle the question in the vast majority of instances, because this affords almost indisputable evidence of myocardial infarction from coronary thrombosis. Finally, in difficult cases, most valuable information is had from electrocardiograms. Certain more or less characteristic distortions of the ventricular complexes are now known to result from infarction of the heart wall. Studied along the lines above indicated, it is possible, I believe, to reach a correct diagnosis in a high percentage of patients with coronary disease who present a clinical picture of acute abdominal symptoms.

FOREIGN BODIES IN THE ELBOW JOINT.—This type of injury, giving rise to a foreign body in the elbow joint, F. J. Kirby has designated "the baseball pitchers' elbow." Frequently a pitcher, during the wind-up, will hold his forearm in slight flexion; then as he prepares to throw the ball, by suddenly and forcibly contracting his triceps muscle and rotating his forearm and hand inward and downward to give all possible speed to the ball as it leaves his hand, he extends the forearm rapidly and fully and the head of the radius is brought backward suddenly and with great force against the condyle of the humerus. The result is that a small piece of cartilage and bone from the head of the radius is chipped off—a chisel fracture of the head of the radius. This small, broken-off piece of bone and cartilage remains about the joint and by constant irritation it is likely to increase somewhat in size. In one case the foreign body was free in the joint; in the other three it was attached by a thin, string-like pedicle. The treatment consisted of opening the elbow joint over the head of the radius and removing the foreign body, and then closing the wound. The lesion (fracture) occurs on the posterior inner surface of the head of the radius. The bodies varied in size, from one the size of a coffee bean to two as large as almonds, and oval. They consisted of cartilage and, when sectioned, were found to contain bone in the centre. The patients did well after removal of the foreign body and secured a fully useful joint, with an arm and forearm as strong as before injury.—*J. Am. M. Ass.* **95:** Aug. 9, 1930.

HEART DISEASE IN MIDDLE LIFE*

BY A. J. MACKENZIE,

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WHEN we reach that rather indefinite time spoken of as "middle life," an age that recedes for each one of us as he grows older, we are certain to be impressed by the dropping out here and there of a man of our own class or time, prematurely we believe, often unexpectedly, men we thought should have lived for many years. Probably they were strong, robust, virile, useful citizens, and suddenly we learn that they have joined the majority, or perhaps have suffered such a collapse that no longer do we meet them in the club or on the links, and the explanation is "He had a heart attack".

The mortality from heart disease has increased by nearly 50 per cent in the United States during the last twenty years, and in Ontario even more during the last ten. In 1919, the deaths from organic heart disease (I quote from the latest report of the Registrar-General for Ontario) were 113.6 per 100,000 of population; in 1928, 173.7. The statistics of the Metropolitan Life Insurance Company for 1928 show a death rate of 143.4 per 100,000 insured, a rise from 117.4 in 1921, and as these deaths occur almost entirely in adults we are justified in the assumption that this astounding increase is due to the later degenerative type of heart disease, the earlier infective type being on the whole unchanged, or possibly lessened, as might be expected from the extended use of measures to combat the focal infections which cause them. This view is supported by the study of the incidence of this cause of death in age groups. It appears first in the age group 5 to 14 with 52 deaths; it is 148 at 25 to 34; 235 from 35 to 44; 461 from 45 to 54; 881 from 55 to 64; 1,001 from 65 to 74; and 2,156 from 75 on.

There must be some cause for this very grave state of affairs. One explanation is that with the rapid reduction in death rate from tuberculosis (over 20 per cent in ten years) and the disappearance of typhoid from our cities, a large number escape these dangers in early adult life and become possible victims of heart disease at a later period. It is hard to believe that this is the whole story, nor will better diagnosis account for it. Perhaps we are reaping some harvest, and I have no doubt that late results of the great epidemic of influenza should be borne in mind, but the rate was already rising rapidly in the preceding decade, as shown by mortality statistics in the United States. There is some factor in our modern conditions not yet discovered, some fault of adjustment to changed conditions of life, which would give the key to the solution of this most serious of social problems, and it demands thoughtful investigation by the best minds in the profession. One is tempted to theorize on the significance of the generally increased standard of living, greater luxury and ease, with altered dietary habits in the midst of a strenuous life; whatever it is it affects our people in general, for, at least in Ontario, I find that the proportion of deaths due to circulatory and heart disease is even greater in the rural districts in proportion to the total mortality than it is in Toronto.

This is not heart disease as we have been accustomed to think of it, rheumatic endocarditis with murmurs, arrhythmia, dyspnœa, and cyanosis, but it is a heart disease in some ways more serious and alarming, because it is cutting off strong active citizens, and because we do not know when or where it may strike and not even its cause. In this paper we exclude from consideration the cases of late rheumatic endocarditis, syphilitic sclerosis of the aorta, and toxic adenoma, all of which are found in middle life. Attention must not be too closely confined to the heart itself; rather do these cases manifest a degenerative cardiovascular syndrome in which the mechanism which should have carried on for twenty or thirty years unexpectedly falters or fails.

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

The etiology in any particular case may be obscure. Focal infection of various kinds may be the explanation, but these patients are often of the class that has had special care in this respect. Moreover, coincident with the increased attention given to such conditions in the last thirty years the number of these cases has been rapidly increasing, while arthritis deformans and the like have been disappearing. Mental strain and worry have been accused, but it is certain that our fathers and grandfathers worked harder and longer hours than we do and had fewer vacations. Perhaps it is that we eat too much or too hastily and live too softly. I believe that one important feature is that, while we take strenuous and fairly continuous exercise in youth, we drop it later almost entirely. Often we see a man taking up golf at fifty, after years of muscular inactivity—a thing he should never do without a thorough medical examination. Another consideration which must not be disregarded is the hereditary and familial tendency, the underlying constitutional weakness, which determines which of a group of men of the same age and social condition will succumb to degenerative heart disease. Riesman in a recent publication says "I am sure the myocardial disease of middle life. . . . . .is preeminently a familial or hereditary affair," and I know a family in Toronto in which all the members, four brothers and one sister, have died from this cause between the ages of forty-five and sixty-five, and all were of a robust, healthy type.

As to the type of person most likely to have degenerative heart disease all statistical evidence shows that the expectancy of life is less in those who are overweight, say, at the age of forty. Those who are 20 to 40 per cent overweight have an increased mortality of 30 to 80 per cent respectively in the following decades, and as the preponderant form of death which awaits all of this age is cardiac, we can fairly assume that the thin person is less likely to succumb and has a greater expectancy. We can all supply reasons why the obese should have cardio-vascular degeneration, but one is rather surprised that the robust healthy man who has never had a complaint and who is the centre of all activities in his circle also so often falls a victim. In fact this is the usual type of person, according to Levine in his study of 145 cases of coronary thrombosis.

"A man is as old as his arteries" is an axiom, and it is further true that the age of the heart is the age of the circulation. The cardio-vascular mechanism is fated to fail at last, if some other organic disaster does not overtake the individual; but as we have seen, the fundamental mechanism is failing too soon in an alarming number of cases. It is our duty, therefore, to be on the outlook for the earliest disturbance of function, so that we may advise such a readjustment of habits and activities as may be necessary to avoid or delay more serious impairment. The history in these cases is often of long duration, but the signs are usually disregarded by the man whose health and virility have been his boast, and who is unwilling to admit even to himself that he is not as fit as he once was; in a man of lesser sensitiveness or intelligence the symptoms may not even be noticed till collapse supervenes. Again the phenomena may be ascribed to some more apparent cause, too often by the family doctor, who makes his diagnosis from the patient's story, and, without adequate examination, lulls his apprehension with a joke and a bottle of medicine.

Cases of degenerative heart disease manifest in the early period symptoms of four types, respiratory, digestive, painful, or oppressive, but any combination of these may occur.

Probably the most frequent story is that of a slight shortness of breath on unwonted exertion, which gradually, as months or even years pass, becomes more marked and more easily induced, and there may be a feeling of constriction about the throat or chest, and even cough. The man finds that he prefers to take the elevator even for one flight of stairs or that he requires two or three pillows at night, and he may have later paroxysms of air hunger in which he has to sit up in bed. Some have spasmodic attacks which are diagnosed as bronchitis or asthma.

In a large number of cases there is noted early some discomfort after meals, a feeling of fullness in the epigastrium and in the substernal area which the patient attempts to relieve by "rifting" air. This is usually noted first after a particularly heavy meal, especially if taken when tired, and if there is exertion such as walking soon after. This sense of

discomfort may become actually painful, a dull, heavy boring pain felt in the chest, in the back under the scapula, or in the region of the mid-thoracic vertebræ, where there may be an area tender on pressure. When discomfort is felt in this area or in the infra-costal region, with copious belching of gas, the diagnosis of gall-bladder disease is commonly suggested. An example is the following:

CASE 1

A man of 68 was referred to the gastro-intestinal clinic at St. Michael's Hospital complaining of indigestion, with constant belching of gas and dull pain. On examination it was found that he had marked arteriosclerosis, and a high blood pressure, and that the pain and belching of gas always followed exertion after eating. The diagnosis of myocardial degeneration, with hypertension, was apparent.

The anginal type merges into that described, commencing with indefinite precordial pain, brought on at first by exertion, but which in the early period tends to disappear with exercise. This may be more noticeable at night, when all symptoms rise more readily above the threshold of consciousness, appearing after heavy smoking or eating, becoming more frequent and more constant, and with a wider radiation until it may be felt in the arm or neck as a tired aching associated with tender spots. Herrick believes that the occlusion of small branches of the coronary arteries may be the explanation of mild but definitely spasmodic attacks of pain. Later in these cases violent or even terminal seizures are likely to occur. The importance of pain in the precordium is often questioned; it is spoken of as functional or neuralgic. Of course all these pains are intercostal, as pain sensation is referred to the somatic nerves, but I believe that when they occur after middle age they are always significant, and if constantly recurring, if induced by exertion, or, following a meal, they point to myocardial damage. In the oppressive type there may be no actual pain but a sense of oppression or constriction, or of weight or fullness, across the upper or midsternal region, coming on on walking especially, after a meal, and becoming easier or disappearing on stopping or on bringing up gas. Both this and the painful type are very likely to appear on breathing cold air.

Mackenzie, in "Angina Pectoris," states that the symptom of breathlessness is produced by an insufficient output of blood from the heart. In these cases adjustment to increased demand is not made readily—the heart muscle is not flexible enough. Pain, on the other hand, is due to an insufficient supply of blood to an active part of the heart muscle. This may or may not be an important or extensive part of the musculature, and so pain may or may not be of serious import. As with other viscera there are no true sensory nerves in the heart wall or aorta, but there are afferent nerves running in two groups, one in the cardiac branches of the vagus, the other in the superior and middle cardiac nerves to the cervical sympathetic trunk, and so to corresponding segments of the spinal cord. When the impulses passing by these afferent nerves are abnormal a state of irritability will be produced in the segment involved and a sensation of pain will be felt in the area supplied by the sensory nerves derived from this segment, and, if the stimulus be continued or repeated, in time there will be an overflow of irritation to adjacent parts of the cord, resulting in a more widespread distribution of the pain; likewise the motor nerves from the segment will be affected, resulting in muscle contraction in the area and a sensation of constriction and oppression. This irritability in the spinal cord may be increased, or even caused, by toxic agents such as coffee and especially tobacco, in that the threshold of pain production is lowered, which explains why many sufferers from degenerative heart disease have pain after smoking a strong cigar or eating or drinking too freely.

It is from the history supplied by the patient that we will probably have to make our diagnosis and estimate the seriousness of the condition, for clinical examination may be and often is disappointing. Every detail of the patient's family and personal history, and a full description of his habits and activities must be elicited. The heart is usually enlarged but the point of maximal impulse and the borders may be difficult to determine in a thick-walled chest, and only the x-ray will give dependable information as to moderate enlargements. Murmurs are not heard in the absence of a complicating endocarditis or advanced changes. The sounds, apart from some loss of clearness in the first sound at the apex.

are likely to be normal, but a reduplication should be regarded as a serious sign. The rhythm is usually regular, but extrasystoles are frequently found, and the patient may have been conscious of them. They may be induced by coffee or tobacco, but the tendency to manifest them in a man over middle age is not accidental. The electrocardiograph provides the most certain method of determining how the mechanism of the heart is functioning; changes in the tracing must be accepted as definite evidence of myocardial disease. The type of change may be of the greatest value in prognosis, but when changes are lacking in the presence of symptoms we should be guided by the latter rather than assume that there is no disease. In a case to be quoted later repeated tracings were normal before an attack of coronary thrombosis. The blood pressure in the majority of cases will be found above what might be regarded as normal for the individual, say, 160/100, and this may be associated with an enlarged heart, but the finding is not invariable, and, moreover, a falling blood pressure in such is a bad sign. Arteriosclerosis, as apparent in the radial and temporal arteries, may be significant, because it suggests that there are probably changes in the arterioles and capillaries of the retina, where they should always be looked for, and further corroboration may be had from the patient's description of localized tingling, numbness or cramp. Careful observation of a man who at first glance appears healthy may reveal some wasting, fatigability, and temperamental change in the form of depression, irritability, and indefinite gastro-intestinal dysfunction. The pulse rate is too readily increased by exertion, and returns to normal too slowly, and may be always fast.

The pathological changes which are responsible for the disease complex described are not well defined and when such cases come to autopsy attention is occupied by the more striking terminal accident, but as the proper function of any tissue or organ is dependent on an adequate blood supply, the conclusion is unavoidable that there is impairment of the blood supply. This is due to slow and ill defined capillary change and arteriosclerosis of the terminal branches of the coronary arteries, a process comparable to that which inevitably accompanies age. In time it leads to thrombotic occlusion, which, when the process is slow and the branches small, and the conducting apparatus is not involved, may not seriously impair function for a time, especially if the Thebesian vessels lend their aid. Accompanying change in the muscle will be found, in the form of fibrosis, scarring, minute infarcts or fatty degeneration.

As these cases progress they usually will develop symptoms by which they may be classified under one of three groups, *viz.*: (1) definite angina pectoris; (2) coronary thrombosis, (a) with instantaneous death, (b) with death inside a few hours, or days, (c) cases weathering the attack and living for months or years; (3) heart failure, as ordinarily understood.

The syndrome known as angina pectoris is well recognized, and we need only mention that it comes on in spasmodic attacks, lasting from a few minutes to half an hour. The condition is usually brought on by exertion; there is no dyspnœa; the pulse rate and blood pressure are unaltered; and it is relieved by nitrites. On the other hand, an attack of coronary thrombosis lasts much longer, the patient is shocked, pale greyish, perhaps vomits; the pulse is weak and rapid and may be irregular; the blood pressure is lowered; the breathing is hurried; and nitrites give no relief. This is followed typically in one to three or four days by a rise in temperature and leucocytosis, and in some cases by pericarditis. When death ensues it may be from the sudden shock, from heart block, rupture of the heart, or ventricular fibrillation.

If we would recognize, and could induce the public to recognize, that for one out of every three of those who have reached the age of forty-five, death from cardio-vascular disease is waiting—it may be, just around the corner —I am sure that we would not have so much difficulty in popularizing the idea of the periodic health examination. Early recognition is absolutely essential if we are to render any real aid to our patients in postponing the cutting of the thread; otherwise all we can hope to do is to smooth the way. The patient must realize that his symptoms are the signs of exhausted reserve and that only by rest can this be recovered; he cannot now get strength by exercise, and all effort, mental as well as physical, must be within the limit of tolerance. Removal of foci of infection is advisable if

there is good reason for regarding them as a factor in the disease, and if too much strain is not entailed. Adjustment of the patient's activities often means a general reorganization of his life, but the medical adviser must not fear to do this if necessary, otherwise there may be no activities to adjust. He will need all his gifts of judgment and tact to impress his patient with the seriousness of his condition, and still leave him with enough hope, interest and serenity to "go softly all the days of his life." It is only fair to the patient himself as well as to his family to convince him of the advisability of putting his affairs in order as sudden, unexpected death is a real possibility in cases that have shown the type of precordial distress described. Medical treatment will be limited to the correction of disorders of bodily function, the assurance of restful sleep and perhaps small doses of digitalis.

The following cases are illustrative:

CASE 2

C. B., a man of 65, an executive in a large business, strong, active, well preserved, gave a history of two mild attacks of pneumonia, after the last of which his pulse rate was always 80 or more, but he could play a good round of golf without fatigue. His blood pressure was 165/100, and electrocardiogram and x-ray of the heart were normal. He was seized suddenly with a cramping sensation in the upper chest, with some difficulty in getting his breath; this was relieved by inhalation of amyl nitrite, but he had repeated attacks for two days, when they quieted down, to be followed by a severe collapse, without pain or sense of constriction, but with a rapid almost impalpable pulse, a grey pallor, and a sensation of great weakness and shortness of breath.

In three days he developed a slight temperature and a leucocytosis, the blood pressure dropped to 90/60, the pulse rate was 90 to 110 and the electrocardiogram showed typical changes of coronary thrombosis. After three months in bed his pulse was about 80, his blood pressure 120/80 and he was able to go about without any discomfort.

CASE 3

C. H., aet. 65, a carpenter, was always well up to five years ago when he had some chronic arthritis, but worked up to three weeks before admission to hospital. At that time he had an attack called "flu", which kept him in bed six days. On getting up he was short of breath, but could go upstairs. He had substernal pain for one week. There was slight cyanosis, no œdema, and the blood pressure was 130/70. Arteriosclerosis was apparent, and, though the apex beat could not be palpated, x-ray showed an enlarged heart. He developed œdema, arrhythmia, general heart failure, and died from an intercurrent pneumonia in three months.

CASE 4

A healthy man of 55, an athlete at college and a devotee of games, gave a history of typhoid at 23, chronic pain in the form of lumbago and sciatica in France during the war, and one attack of tonsillitis eight years ago. A rough systolic bruit was discovered at examination for insurance four years ago, which probably was not present on discharge from the army in 1919. He first noticed a tendency to forcible heart action with an occasional extra-systole, but without tachycardia, especially after smoking at night. Then some pain, not severe or continuous, centred at the third left interspace, spreading to the axilla. Lately he had noticed particularly a feeling of substernal pressure, with belching of gas on exertion after meals. This was worse on breathing cold air, and was followed by a dull soreness in the interscapular region to the left, felt on lying on this area. On one occasion he had what he described as a vice-like constriction of the upper chest, which was not painful. As a rule these symptoms disappeared with exercise. The blood pressure ranged from 130 to 150, systolic, and the pulse was usually normal. The symptoms were more insistent after a heavy meal or much smoking.

THE PATIENT WITH HEART DISEASE AS A SURGICAL RISK.—Four hundred and fourteen patients suffering from heart disease, who underwent 494 operations, were studied by Stuyvesant Butler, Neil Feeney, and Samuel A. Levine, in order to determine the risk of operation and the rôle played by the heart on the outcome. Deaths were divided into two types, "unexpected" and "inevitable." There were 28 unexpected deaths; *i.e.*, a mortality of 6.3 per cent. One hundred and forty-seven operations were performed on 120 patients with valvular heart disease, with 3 unexpected deaths; *i.e.*, a mortality of 2.1 per cent. One hundred and sixty-seven operations were performed on 138 patients having chronic myocarditis, with eight unexpected deaths; *i.e.*, a mortality of 4.9 per cent. These patients were mostly older persons and tolerated operation well. There were 108 operations performed on 87 patients with auricular fibrillation, with 3 unexpected deaths; *i.e.*, a mortality of 3 per cent. Contrary to the general opinion, the risk of operating on such patients is not great. Forty-one operations were performed on 35 patients having angina pectoris, with 3 unexpected deaths, *i.e.*, a mortality of 7.7 per cent. There seems to be a slight risk of coronary thrombosis following in the wake of surgical intervention in patients with angina pectoris. There were 20 operations performed on as many patients with coronary thrombosis. There were 8 unexpected deaths; *i.e.*, a mortality of 44.5 per cent. Various measures discussed here should materially diminish this high death rate. Thirteen operations were performed on 11 patients with syphilitic aortitis. There was one unexpected death. there were 6 patients with paroxysmal tachycardia, 3 of whom had attacks during operation and 3 after operation. All recovered. There were 50 operations performed on as many patients with congestive heart failure. There were 7 unexpected deaths; *i.e.*, a mortality of 17.1 per cent. There were 433 operations performed on 359 patients having heart disease without nephritis. Twenty unexpected deaths occurred; *i.e.*, a mortality of 4.9 per cent. There were 61 operations performed on 55 patients having heart disease with nephritis, with 8 unexpected deaths; *i.e.*, a mortality of 14.8 per cent. Conditions for which there are non-operative palliative methods of treatment should not be subjected to surgery when the heart disease is so grave that the ultimate life expectancy, at best, is short. In most types of heart disease the surgical risk is not appreciably greater than in the normal person. In some in which the risk would be great, it may be materially diminished with proper pre-operative diagnosis and therapy.—*J. Am. M. Ass.* **95:** July 12, 1930.

STUDIES ON A CASE OF SICKLE-CELL ANÆMIA*

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SICKLE-CELL anæmia as a clinical entity is of comparatively recent recognition, being first described by Herrick[1] in 1910. Since then there have appeared in the literature numerous reports of clinical histories, pathological findings, and some laboratory investigations of this condition. Our reason for reporting this case is to place on record our observations on the behaviour of the erythrocytes "*in vivo*", in this, the first case of sickle-cell anæmia to be reported from our Canadian clinics.

The condition which Herrick described occurred in a negro, 20 years old, who presented a cardiac enlargement, albuminuria, general adenopathy, icterus, and a secondary anæmia which was not remarkable for the great reduction in red corpuscles or hæmoglobin, but was strikingly atypical in the large number of nucleated red corpuscles of the normoblastic type and in the tendency of the erythrocytes to assume a slender sickle-like shape. The shape of the red cells was very irregular and there was a large number of thin elongated sickle-shaped and crescentic forms which were seen both in fresh specimens and in specimens fixed by heat, alcohol, and ether, and stained with the Ehrlich triacid stain, as well as with the control stain. The second case was reported by Washburn[2] in 1911, and in 1915 Cook and Meyer[3] reported the third case and considered the condition of familial incidence. Emmel,[4] who studied this third case and reported his findings in 1917, presented the important observation that the number of sickle-shaped cells increased in sealed wet blood preparations, and that during periods of remission, when no sickle cells were found in the patient's blood, the typical forms would appear in sealed wet smears on standing. This cultural characteristic he considered specific of the condition, and demonstrated its presence in an apparently healthy member of the patient's family. He suggested that the phenomenon, in part at least, was due to accentuation or abnormal activity of the same factors which in normal hæmatogenesis are involved in the transformation of the original spherical erythrocyte into a biconcave disc-shaped form.

Sydenstricker,[5] in 1923, who was the first to report sickle-cell anæmia in children, considered the condition a familial and hereditary disease, showing no sex preference and probably confined to the negro race. He suggested that it might be a hereditary defect of the spleen and blood-forming organs with the resulting change in the erythrocytes which predisposes to hæmolysis and phagocytosis. He drew attention to the following symptoms in these cases; dyspnœa, palpitation, and weakness referable to the anæmia; muscle and joint pains of considerable severity at frequent intervals; frequent attacks of nausea and vomiting, associated with epigastric and left hypochondriac pain; low fever; frequent night sweats; a greenish yellow discolouration of the scleræ, which varies in intensity and is most marked during the abdominal crises; pale mucous membranes, general lymphadenoid hyperplasia; heart changes associated with anæmia; enlarged liver; peculiar leg ulcers in some cases, or scars of these ulcers (these are rare in children); urobilinuria.

The blood picture in these cases is characteristic, showing a secondary anæmia with smears presenting the peculiar sickle-shaped erythrocytes in varying numbers, and the tendency of the erythrocytes when prepared in sealed wet preparations to exhibit an increase in the number of sickles on standing or incubating, as has already been mentioned.

Huck,[6] in 1923, showed that in sealed wet preparations there was "sickling" of practically all cells at the end of 24 hours but

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that after 3 days to 6 weeks the cells had assumed a circular form again, thus establishing the reversibility of the reaction. He considered the sickling of the red blood cells to be due to something inherent within the cells, not to any substance in the serum, and to be possibly a surface tension phenomenon, not occurring in the circulating blood to any marked degree. After following two families through three generations and finding sickling in each generation, he concluded that the condition was transmitted according to Mendelian law. In very beautiful *in vitro* experiments Hahn and Gillespie[7] showed the phenomenon of sickling to be dependent on the oxygen tension and they suggested that sickle-cell formation *in vivo* would probably be induced or increased by anoxæmia.

The pathological findings in cases which have died of active sickle-cell anæmia differ somewhat. Wollstein and Kreidel[8] report from their cases "fatty degeneration of the myocardium and liver, distention of the sinuses of the spleen with sickle cells, phagocytosis of the sickle cells by Küpffer cells in the liver, and iron pigment in the spleen, liver and kidneys." Cooley and Lee,[9] from three autopsies, reported "No special findings either in the spleen, liver, or bone marrow."

CASE REPORT

L. H., a female negro child, 7 years old, was admitted to the Montreal Homœopathic Hospital in February, 1929, and following the diagnosis of her condition was transferred to the Royal Victoria Hospital for further study. Her complaints were cough, night sweats, vague pains in legs and joints, and occasional abdominal pain, poor appetite, and increasing fatigue.

Personal and family history.—The child was born in New York City, and came to Montreal in April, 1928, to live with a maternal aunt, who gave us the details of the history.

The father and mother were coloured and living in New York. Their coöperation at a distance was not of the best and our request for examination of their blood was not granted. We examined the blood of the maternal aunt and grandmother, but found no evidence of sickling, either active or latent. There were two other siblings, one of whom had died with symptoms similar to those of our patient.

The present patient had been a full-term child, and so far as we could ascertain had had an uneventful early history, with the exception of chicken-pox and periods of suffering from symptoms similar to those presented on admission.

Physical examination.—On examination the child was fairly well nourished. There was marked pallor of the mucous membranes and of the palms and soles. The scleræ were greenish yellow in colour. There was no general adenopathy. The heart was slightly enlarged and there was a soft systolic murmur, heard at the apex but not transmitted. The liver and spleen were not palpable.

Laboratory findings.—The urine was negative, except for a slight urobilinuria. The stool showed no parasites. The blood Wassermann test was negative. There was a positive reaction to 1/10 mg. of old tuberculin, given intradermally. An x-ray picture of the chest showed enlarged glands at the hilus of the lung, but the lung parenchyma was free. The basal metabolic rate was −14 (DuBois standard) or −23 (Talbot-Benedict standard).

Blood chemistry.—Plasma: inorganic phosphorus, 3.6 mg. per 100 c.c.; chlorides, 369 mg. Cl. per 100 c.c.; CO_2 capacity, 56 vols. per cent; protein, 5.0 mg. per 100 c.c.; cholesterol, 122.5 mg. per 100 c.c.; total base, 167 mg. per 100 c.c.

A complete morphological blood examination was carried out on February 27th, with the following findings. The erythrocytes numbered 2,600,000 per c.mm., while the hæmoglobin was 45 per cent (6.3 grm. to 100 c.c.), giving a colour-index of 0.87. By the routine method of staining with the Jenner-Giemsa solution the red cells stained well, with relatively slight anisochromia and polychromatophilia. There was moderate anisocytosis, with a tendency for the circular forms to be smaller in diameter than normal. About 10 per cent of the erythrocytes were distinctly sickle-shaped, banana-shaped, oat-kernel shaped, or of similar forms. There was no evidence of punctate basophilia. In the process of doing a differential leucocyte count on 500 white blood cells, 3 nucleated red cells were encountered; they were all of the orthochromatic normoblast type. No nucleated sickle cells were observed. The total corpuscle volume was 20 per cent, that is, 45 per cent of normal, from which the average corpuscle volume figures 77 cubic microns, and the hæmoglobin concentration 1. Preparations stained by brilliant cresyl blue showed the presence of reticulations in approximately 50 per cent of the red cells. Estimation of the fragility by the combined macroscopic and microscopic method, described by Waugh and Chase[10] showed a moderately increased resistance. The viscosity of the blood was only moderately reduced.

The white blood cells numbered 12,000 per c.mm. Differential count on 500 cells showed polymorphonuclear neutrophiles, 44.5 per cent (5328); neutrophile myelocytes, 1 per cent (120); eosinophiles 4.8 per cent (576); "mast-cells", 1 per cent (120); monocytes, 9.6 per cent (1152), and lymphocytes, 39.2 per cent (4704).

The numbers in parenthesis indicate the number of each form per cubic millimetre. There was present, therefore, an increase in all forms, but more particularly of the eosinophiles and monocytes, with the presence of some slightly immature myeloid elements.

The platelets numbered 258,000 per c.mm., and showed abnormal irregularity in size and shape. The bleeding-time was not appreciably prolonged. Tests for coagulability of the blood gave the following results:—fibrin formation, 2.5 min.; congealing, 10 min.; congealing in the presence of added calcium chloride, 4 min. There was present, therefore, a rapid fibrin formation, with delayed congealing which was accelerated by the addition of calcium. Clot retraction occurred.

The blood serum was yellow with a distinctly greenish tinge. The van den Bergh test gave a prompt direct negative and a strongly positive delayed direct reaction. By the indirect method there was found to be 2.6 units of bilirubin. Estimation of refraction by the dipping refractometer gave a reading of 63.6, which is rather high and indicates approximately 9 per cent of protein.

Subsequent complete routine examination of the blood on March 28th showed essentially the same general blood picture. The anæmia had increased slightly; approximately 20 per cent of the erythrocytes were sickle-shaped forms; nucleated red cells of basochromatic and polychromatic type were present, and occasional Howell-Jolly erythrocytes were found. As previously no nuclei nor Howell-Jolly bodies were met with in the sickle-cells. The bilirubinæmia was slightly higher.

At the time of the first examination wet sealed cover slip preparations were made. These showed immediately after preparation about 10 per cent sickle-cells, which increased on standing 24 hours to over 80 per cent. An attempt was then made to make dried smears from the cover slips by removing the seal and spreading the still fluid blood upon a slide. It was found, however, that on exposure to the air an immediate reversal of most of the cells to the normal form took place. In fact, this reversal was so rapid (practically instantaneous) that it was found impossible to obtain dry preparations showing the high percentage of sickle forms in this way. Approximately 10 per cent of the cells in the dried smear showed the sickle shape after this treatment, which suggested the possibility that they represent the original sickle cells and are of a more persistent character.

Hahn has shown by his *in vitro* experiments that this phenomenon of "sickling" depends upon the partial oxygen pressure and we were interested to see whether this fact could be demonstrated *in vivo*. At another sitting, therefore, the following experiments were carried out. First, as a control, blood was obtained from the finger in the usual way, and from this dried smears and wet sealed preparations were made. The dried spreads showed 2.6 per cent sickle cells, the wet sealed films immediately after preparation, 5 per cent, which on standing as previously for 24 hours showed at the centre of the film distortion of almost all the cells, though much less so at the periphery of the cover slip, where slight contact with air through the seal is possible.

We then produced stasis in the finger by means of a rubber band placed about the proximal portion, and, after five minutes and with the band still in place, made dried smears and wet preparations from a puncture wound at the end of the finger. The blood was distinctly darker, venous in character. In making the wet preparations care was taken to wipe the finger free of blood, and as fresh blood came forth from the wound, to make preparations as quickly and with as little exposure to the air as possible. It was found on microscopic examination that while the dried preparation showed no appreciable increase in the percentage of sickle cells, in the wet preparations, 28 per cent were markedly distorted and practically all the cells showed some irregularity. A very bizarre appearance was presented and particularly interesting was the tendency for the cells to take on besides the ordinary sickle shape, irregular forms with one or several long drawn out fine, spinous processes. Opening of the wet preparation, with exposure to air, caused the majority of the cells to return to the circular form, approximately 5 per cent still retaining their sickle form.

Similar experiments were then carried out, employing venous blood from the arm without and with the production of stasis by the use of an Esmarch bandage. In the former case, wet preparations showed approximately 20 per cent

distorted forms, while in the latter nearly all the cells (estimated at 90 per cent) showed irregularity. The results of these experiments were confirmed several times at subsequent sittings. The findings on each occasion were essentially the same. Control experiments on normal individuals of course failed to show the phenomenon.

A study was then made of the relation of reticulocytes to the sickle cells. It will be recalled that approximately half of the erythrocytes had shown reticulations. Wet preparations using brilliant cresyl blue were made in the usual manner. It was found that the majority of the reticulocytes were circular forms, although occasionally reticulations were seen in sickle cells. About 50 per cent of the sickle cells showed one, two, three or even more fine reddish granules which vibrated actively within the cell. It seemed that the more typically sickled forms showed less tendency to the presence of reticulations. This has a certain importance when we bear in mind that reticulocytes represent immature or incompletely developed erythrocytes. Apparently, therefore, the sickling is not a particular

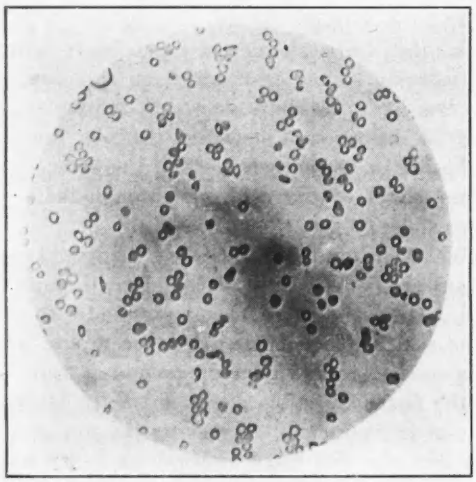


FIG. 1.—Photomicrograph (low power). Wet sealed preparation from blood of finger without stasis. Only an occasional cell shows "sickling."

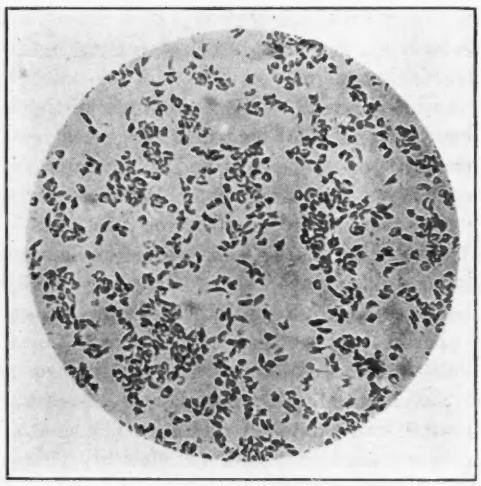


FIG. 2.—Photomicrograph (low power). Wet sealed preparation from blood of finger with stasis. Practically all erythrocytes show typical "sickling," or distortion.

FIG. 3.—Photomicrograph (high power). Same as Fig. 2.

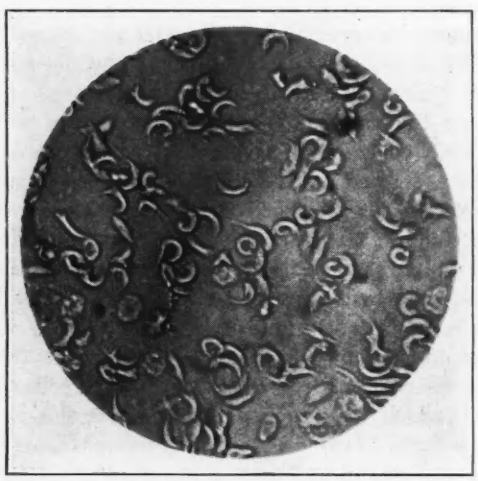


FIG. 4.—Photomicrograph (high power). Showing tendency of cells to form bizarre shapes with long fine spinous processes.

property of the less mature erythrocyte, but on the contrary is more pronounced in what we should consider the older, more mature forms.

To determine the correlation between gaseous changes in the blood and the phenomenon of sickling, further experiments were carried out as follows. Blood was obtained from the antecubital vein and was taken in paraffined syringes under oil and wet preparations speedily made. The cells were examined and oxygen and carbon dioxide capacities estimated on three samples. (1) Blood taken without the application of an Esmarch bandage; (2) blood taken after marked stasis had been established by means of a tight Esmarch bandage; (3) blood taken after friction had been applied, and the arm immersed in hot water to promote maximum oxygenation.

The following table is interesting.

	CO_2 Content	O_2 Content	Percentage of O_2 Saturation	Percentage of Sickle Cells
	vols. %	*vols. %*		
Blood; without stasis	50.3	3.2	33	15–20
Blood; with stasis	49.5	2.2	23	95
Blood; after friction and immersion in hot water	44.9	6.0	62.5	5

CO_2 capacity=56.6 vols. %
O_2 capacity= 9.6 vols. %

In studying the oxygen dissociation curve of this patient—see Chart I—we find that there is a distinct shift to the right from the average normal. Aside from this shift to the right, the type of curve is essentially a normal one. The shift however is not peculiar to sickle-cell anæmia, but is seen in other forms of anæmia, and is probably dependent on an increased hydrogen-ion concentration of the blood, coincident with insufficient oxygenation. It demonstrates the greater ease with which oxyhæmoglobin is dissociated under these conditions and oxygen liberated to the tissues.

From this curve and the table we were able to plot a curve (see Chart II) showing the relationship of the O_2 pressure, in mm. Hg. to the percentage of sickle cells which we found in the patient's blood at the different per cent O_2 saturation, incident with anoxæmia and maximum oxygenation. The curve shows a definite change with increased sickling around a pressure of 40 to 45 mm. Hg. While sickle cells are present under higher tensions of O_2, a very marked increase in these forms is evident around an O_2 pressure of 40 to 45 mg. Hg. That this is no mere coicidence is evident from Hahn's and Gillespie's experiments *"in vitro"*, in which they showed that sickling takes place when the partial O_2 pressure falls below 45 mg. Hg. This very interesting *in vivo* finding thus corroborates the *in vitro* observation which had been made several years before.

CHART I

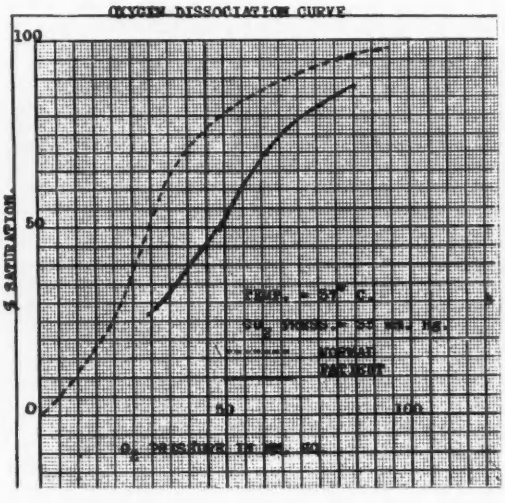
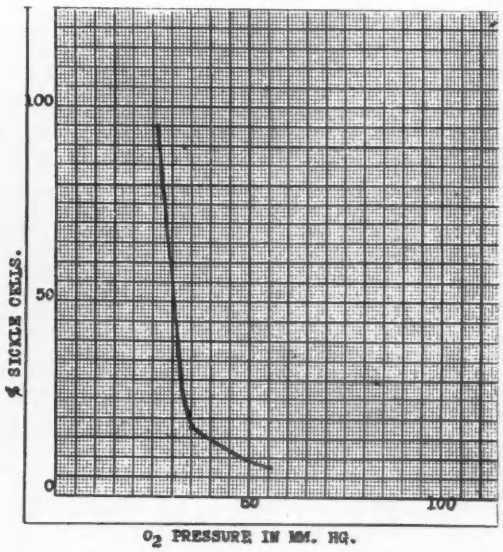


CHART II



From these observations it might appear, following our ability to produce sickle cells at will *in vivo*, that the large aggregations of sickle cells seen in sinuses, vessels, and organs at autopsy may be purely an agonal phenomenon, when O_2 pressure must in the process of death be lowered well below the critical point. The same would account for the findings of these aggregations of sickle cells in spleens removed by surgical operation in cases where the factors of anæsthesia and finally clamping of the vessels must of necessity produce a high degree of anoxæmia within the organ itself. The technique employed in fixing the sections would effectually prevent oxygenation which might reverse the reaction, and so sections would represent the condition prevailing at the time of removal.

From the ability of the cells to "sickle" in the blood stream, and from the reversibility of this reaction we would agree with other observers that the condition is probably not a disease of the spleen or the bone marrow, but is due to an inherited property of the red cells which follows the Mendelian law and is peculiar to the negro race.

SUMMARY

We have reported a case of sickle-cell anæmia observed in Canada, and have shown that the number of sickle cells in the blood *"in vivo"* may be varied by the change of the partial O_2 pressure; that this is a reversible reaction; and that sickling takes place when the O_2 pressure falls below a pressure of 45 mm. Hg. These observations agree with findings previously noted *"in vitro"* by Hahn and Gillespie. An explanation is advanced for the presence of large aggregations of sickle cells in organs obtained at autopsy or operation.

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IN WHAT POSITIONS DO HEALTHY PEOPLE SLEEP?—H. M. Johnson, T. H. Swan and G. E. Weigand made a study of 112 persons, who were under nightly observation for periods ranging from several weeks to two years. Of the healthy subjects, twenty-two were college men, housed in an experimental dormitory of the Mellon Institute; twenty were married people near middle age, and two were children. Besides this group they obtaine similar records on fifty tuberculous women and on twenty patients under treatment for nervous or mental disorders, or for drug addiction, as the case might be. They also had access to the results of a similar study, made by the same method, of twenty young children, between the ages of 2½ and 5 years, and of another on varsity athletes. The results are as follows: The most typical of our healthy sleepers changes from one gross bodily position to another between twenty and forty-five times in the course of a typical night of eight hours, each of these stirs being separated from its nearest neighbour by at least two and a half minutes. Approximately half of all the postures that he takes on such a night are held for less than five minutes; about a fifth, for from five to ten minutes; about a tenth, for from ten to fifteen minutes, and so on. Less often than once a night does he lie still for as long as an hour at any one time. There are large variations among individuals, and the same individual also varies considerably from night to night. The next question is, What particular poses are favoured? The answer is being obtained by photography. A motion picture camera is arranged so that it automatically takes a picture of the sleeper when he first touches the bed; a second picture one minute after he has ceased to stir; a third when he stirs again, and so on. By this ingenious apparatus the authors obtain as much information on 7 or 8 feet of film as they could get on 5½ miles of film if the camera were operated continuously. The face of a telechron clock, which hangs beside the bed, is photographed with the sleeper. Thus they can tell, by as close as one second, how long the sleeper maintains each posture that he keeps for as long as one minute. A 100 watt Mazda lamp, hung directly above the bed, provides enough illumination. It would be preferable, in many ways, to employ invisible radiation, but continuous exposure to ultraviolet rays was not desired, nor was a flashing source of ultraviolet illumination practicable. They require their subjects to wear a dark taffeta bandage over the eyes at first; but after three or four nights they become accustomed to the light and discard it. The photographic records show no more stirring than the motility metre shows in a dark room. As the subject must dispense with blankets, they employ artificial ventilation and control the temperature of the sleeping chamber at 80 + or − 2 degrees F. They present a series of pictures showing the various positions that one representative sleeper assumed on one typical night, in the order in which they were taken, together with the time that each was held. The sketches were made from enlargements of the original photographs. It looks as if the most restful night's sleep is characterized by the use of a considerable variety of bodily positions, all of which are contorted; none of which indicate anything like "complete relaxation" of all parts of the skeletal muscular system, such as one may observe in a fainting person; but each of which appears to be well adapted to the relief of irritation that was set up in the posture last taken, as well as in the day's activities. To get a healthy person to spend a night in any one position that the physicians recommend, one would need to strap him to a frame, or else put him into a cast and then prop the cast.—*J. Am. M. Ass.* **94:** June 28, 1930.

BIRTH TRAUMATISM AS A FACTOR IN URINARY INFECTION*

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IT was Sir Thomas Browne who expressed the pious wish "that men could procreate like trees". Whether this is a method that will meet with general approbation or not there is no doubt that the act of parturition entails great trials on the part of women and is not infrequently followed by serious disabilities. One of the more or less inevitable consequences of the child-bearing act is traumatism to the mother. The relief of this disability comprises a large portion of the daily work of the gynæcologist. That an urologist should have any participation in this train of consequences may seem strange to some, but there is an intimate association, not so generally recognized as it should be, which seems worthy of being considered here.

One of the evils of the excessive specialization of the present day is to be found in the liability of borderline cases to be neglected. The two systems—the genital and the urinary tracts in the female—are in such close anatomical propinquity, and one is so prone to be affected by a pathological condition in the other, that the danger of an individual falling between the gynæcological and urological stools is especially great. In both these specialties there exists the danger of error, due to a lack of mutual coördination and coöperation, and a lack of emphasis upon the interdependence of abnormalities of the two tracts, and a disregard of the fact that a lesion in one tract is apt to have as its starting point a lesion in the other. From being involved in this error the general practitioner is no more immune. As a result, treatment is not always based on a true conception of the underlying cause and is empirical, irrational, and often futile.

Not all birth traumatisms have the unpleasant tendency to produce urinary tract infection. Rectocele and enterocele, when they exist alone, have no effect in this respect. It is the cystocele and the uterine prolapse that so affect the bladder as to bring about in many cases an infection of the urinary tract. To these two birth traumatisms we shall pay particular reference.

At the outset, we wish to emphasize this indisputable fact that many infections of the urinary tract are directly caused by a lesion of the genital tract, the result of birth trauma. The simple cystitis may have as its cause an equally simple and innocent looking cystocele. The fact of this association is too frequently not realized, even by gynæcologists, and, unless it is, "all the drugs of Alexandria and Damascus" in the form of bladder washes and urinary antiseptics will not effect a permanent cure. Only the removal of the cause, and the repair of the disordered genital tract can effectually do this.

First, let us consider these two points: (1) In what way is the urinary tract involved in the birth traumatism? (2) How does its infection arise?

As regards the involvement of the urinary tract it is perhaps not to be expected that I should deal with this branch of the subject in too much detail, or even with assurance. The more so, as I am credibly informed that gynæcologists do not see eye to eye as to the exact manner in which cystocele is produced. It is however essential for a correct understanding of the subject that I recall some elementary considerations, more particularly with respect to the bladder lesion.

The bladder is mainly supported by the pubo-cervical or utero-pubic fascia, a series of parallel fibres of unstriped muscle, attached in front to the pubic bone, and to the cervico-vaginal junction behind. On this "pelvic shelf", so Bonney[1] styles it, the bladder rests. If for any reason the shelf gives way the bladder drops with it. The pubic attachment of the fascia is very firm, but its posterior end is less yielding to forceful pressure during

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labour. At this time, this attachment may be torn away, leaving a "weak spot" in front of the cervix which favours gradual prolapse of the bladder floor. Another result of the pressure to which the fascia is subjected during labour is seen in a thinning-out and separation

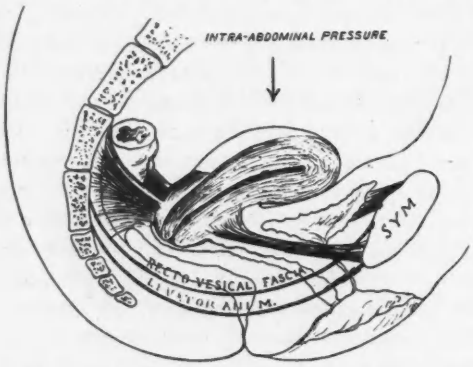

FIG. 1.—Relations of uterus and bladder in normal position. Antero-posterior fascial sling formed by utero-sacral ligaments posteriorly and utero-pubic fascial plane anteriorly.

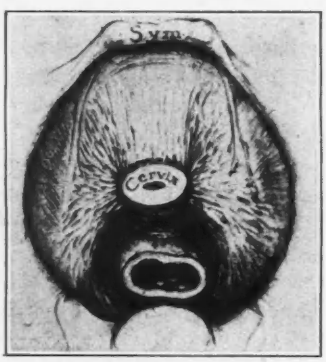

FIG. 2.—Utero-pubic fascia viewed from above. The dotted line shows the weak spot. (After Frank; kindness of Dr. H. M. Little).

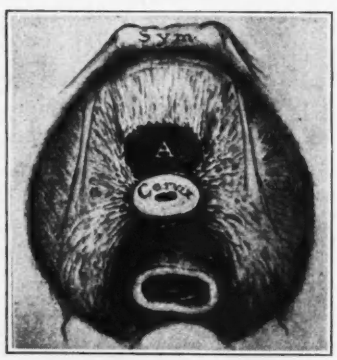

FIG. 3.—Utero-pubic fascia viewed from above. Hernial ring of cystocele through weak spot (A). (After Frank; kindness of Dr. H. M. Little).

of the fibres of the fascia. As Bonney aptly expresses it, the fascia "buckles" or "hammocks" downwards. In the hammock lies the bladder base. Naturally enough the anterior vaginal wall falls with it. Seen from the vagina, the cystocele consists of the bulged anterior vaginal wall, the "hammocked" pubo-cervical fascia, and the pouched bladder base.

With the downward displacement of the bladder there is practically always associated a prolapse of the cervix and, with it, the uterus, with resultant retro-displacement of that organ. From our point of view, however, it is in the bladder displacement that is found the important factor in producing urinary infections.

How does this infection arise? In the production of infections in the urinary tract there is no factor which predisposes more than that of obstruction. In fact most acute and chronic infections may be traced to this embarrassment of urinary drainage, and their successful treatment largely depends upon the finding of the obstructing factor, and upon our ability to completely relieve it or palliate its effects. Young[2] has recently brought into general use the term "obstructive uropathy", which comprises all the changes resulting in the urinary organs from obstructions to the free outflow of urine.

The sagging of the bladder floor, as described above, results in the formation of a pouch, a cul-de-sac, an acquired diverticulum of the bladder, a "*bas fond*", which is not without analogy with that occurring in prostatics. This *bas fond* is emphasized by the emergence of a shelf of trigone, held solidly under the pubic arch by the urethra, and laterally by the ureters.

In the extreme degrees of prolapse, when the cystocele fills the vagina, or even leaves it by the vulva, the trigone and ureters may be drawn down with it. In any event, there is produced a bladder with a high level outlet, the so-called "teapot bladder". Naturally enough, the bladder under this handicap will empty itself with difficulty and incompletely, and residual urine will be present. The bladder muscle hypertrophies in an effort to overcome the impediment, but sooner or later weakens, thins and dilates, with the production of sacculation and increase in the size of the cystocele. The effect on the upper urinary tract is no different from that produced by any other lower tract obstruc-

tion, though the effects are never quite so great as a corresponding obstruction in the male lower tract. Some degree of dilatation of the ureters, the renal pelves, and thinning of the renal cortex, with depreciation of renal function are natural sequences. Even before the obstructive uropathy has progressed so far, the terrain has become ready for the seed, the infective agent, which may be lying in wait in some intestinal, genital, or other handy focus. It only requires some transient lowering of resistance, by fatigue, chill, excess of any sort, for the infection to burst forth in full bloom.

Not all cystoceles are followed by infection. A small cystocele will frequently be accompanied by severe bladder and kidney infection. Some

FIG. 4.—Third stage of uterine prolapse, with cystocele, showing "teapot bladder" (A). (After Dudley).

women with extremely large ones will live for many years without inconvenience of any sort. I recall the case of an old lady who had carried her uterus and most of her bladder outside the vulva for many years, as testified by their excoriated integuments. Suddenly she fell ill, with chills, elevated temperature, coated tongue, and scanty and frequent urinations. When seen in consultation, her blood had a high urea content, she was definitely azotæmic, and presented the typical picture of an acute pyelonephritis. Replacement of the uterus was speedily followed by subsidence of all her symptoms. She was later successfully relieved of the encumbrance by a gynæcologist. The incidence of infection under such circumstances follows the same rules and is dependent upon varying degrees of local and general resistance, as in other organs of the body. Even if infection be delayed or remains absent, the potentialities are always present, like the Damoclean sword.

It frequently happens that factors additional to the cystocele are present. These increase the predisposition to urinary infection. Recently I have had under my care a multipara with a cystocele which hitherto had given only symptoms of irritability of the bladder. Shortly before I saw her she had been taken ill with an acute left sided pyelonephritis, rather severe in type. In addition to the cystocele, she had a uterus, bulky from the presence of fibroids, which only increased the vesical or ureteral block. Cure has followed an appropriate gynæ-

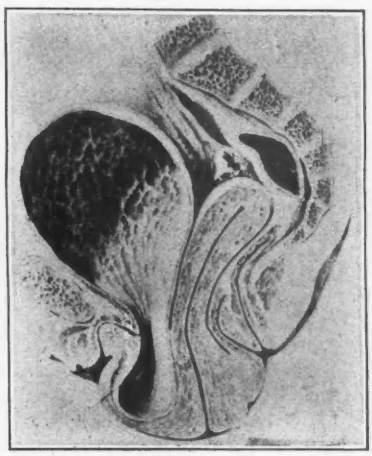

FIG. 5.—Cystocele (A) and its relations (Guiteras).

cological operation. In this case an associated cervical laceration constituted the focus for her infection.

SYMPTOMATOLOGY

Any lengthy consideration of this aspect of the subject does not now seem necessary. To a few points, however, I wish to refer.

First; with regard to the frequency of the association of gynæcological and urological conditions, as shown by statistical reports. Stevens and Henderson[3] found that 27 per cent of the urinary cases in a large women's clinic had probable etiological factors in the genital tract. Furniss[4] found that 30 per cent, Stark[5] 35 per cent, of their gynæcological patients suffered from irritability of the bladder. Bugbee,[6] writing from the opposite point of view, in a series of 1,000 cases of

frequency of urination, found the etiological factor in the genital tract in 24 per cent.

This frequency is due to two causes; first, a congestive, and second, a mechanical. The congestion predominates in the early stages of the trouble and results from the traction exercised on the neck of the bladder, whose circulation and innervation are affected. Frequent micturitions result, sometimes slightly painful, particularly at night. Later the mechanical difficulties play their part. Slight dysuria may be present. With partial retention and the onset of infection the difficulties of normal bladder function are enhanced.

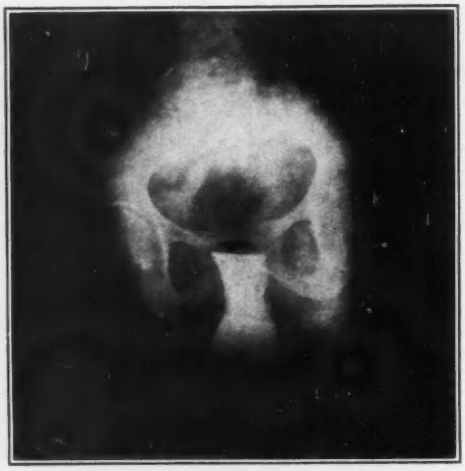

FIG. 6.—Cystogram. Marked prolapse and cystocele, before operation.

FIG. 7.—Cystogram. Case illustrated in Fig. 6 after operation.

It should be mentioned that with cystocele, incontinence, certainly the true variety, does not prevail; a degree of retention is the rule. Incontinence if present would be the overflow of retention, so frequently seen in men. A true incontinence is however frequently found in women, of the diurnal type, and due to a birth traumatism. While it does not properly come within our present bounds, I am taking the liberty of referring to it, as I have sometimes seen it associated with cystocele. Many women complain of an inability to hold their urine when any effort is made, such as running, jumping, coughing, sneezing, and so on. Under these circumstances some urine involuntarily escapes. This is due to a weakness of the pubo-cervical fascia at its anterior end, through which the urethra passes. According to Bonney, sphincteric control is largely centred in the fibres of the fascia, and the fascial weakness results in failure of the sphincteric mechanism to function properly.

DIAGNOSIS

As the main avenue of approach to this subject has been urinary, diagnosis need only be considered from the urological point of view. May I stress the importance of ascertaining the underlying cause of any urinary infection and particularly of cystitis, which will ordinarily be found to be of an obstructive character. It is therefore essential that a careful physical examination be made. Of prime importance is the vaginal examination. It is just as important in the female as the rectal examination in the other sex. I see corresponding failures to make a diagnosis in the field of which we are now speaking by the omission of making not even a vaginal inspection. This alone will frequently explain the infection at a glance. At times, and in the case of small cystoceles, the prolapse or bladder sagging will only be evident when the patient is examined in the upright position. Similarly, a cystocele of moderate extent may be intensified when the patient is so examined. One of my gynæcological friends plaintively tells me that most practitioners think the cystocele has to be as big as a grapefruit before they will call it one. The use of the catheter is advisable for the detection and measurement of residual urine, which will frequently be found.

The method of cystography has recently been applied to the demonstration of bladder prolapse in the urological and gynæcological departments of the Montreal General Hospital, and I am indebted to Dr. H. M. Little and his staff for some excellent illustrative cystograms. These pictures may be taken in the recumbent and upright positions and will then show very beautifully the comparison between the two. It will occasionally be necessary to exclude other conditions in the urinary tract. Accordingly, ordinary methods of urological examination may be deemed wise, such as x-ray of the urinary tract, cystoscopic examination, and even ureteral catheterization and pyelography.

The cystoscope will often reveal the condition. A high trigonal shelf with pouching behind the trigone and laterally will be noted. The ureters may be found lying on the upper

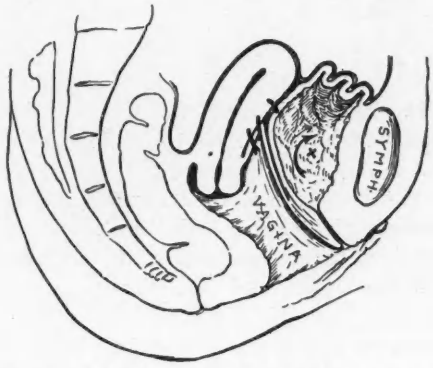

FIG. 8.—Principle employed to correct cystocele in a child-bearing woman. (Kelly).

declivity of the shelf. Additional evidences of obstruction may be seen in trabeculation and sacculation of the bladder wall. Cystitis, trigonitis, even renal infection, are to be expected, according to the severity or chronicity of the infection.

The state of the kidneys should not be disregarded. Impaired renal efficiency from infection or back pressure, or both, is liable to occur. The same precautions are to be observed pre-operatively, as in similar obstructive conditions in the male. Repeated renal functional tests may be required. Fortunately, the renal changes are rarely so severe as in the male, as the urinary obstruction seldom becomes so complete.

THERAPEUTICS

The treatment of the urinary infection is likewise foreign to our present purpose. Only a few general remarks need be made. When a urinary infection has been found to be due to a failure of the normal bladder supports, in such a way as to embarrass the evacuation of urine, the only logical remedy is to support the bladder in as nearly normal a position as is possible, either by a pessary or by operation. Operation should be performed only when acute inflammation, where present, has subsided. The essential feature of any operation is that permanent support shall be given to the bladder floor. Until recently this desideratum was not always ob-

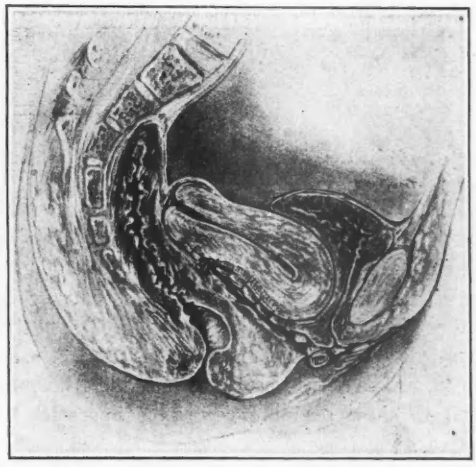

FIG. 9.—Principle employed to correct cystocele in a woman past the child-bearing age. (Kelly).

tained, except temporarily and the bladder symptoms have recurred. The measure of success obtained by the gynæcological surgeon in the class of case to which I am referring will largely depend on his appreciation of the bladder factor, on his recognition of the anatomical principles involved, and on his skill in adapting his operation to the individual case.

I shall not burden you with statistics. I can, however, testify to the great relief which many of my patients, with almost intolerable urinary infection, have obtained from a properly performed gynæcological operation. Palliation is usually obtained. Perfect cure is not always possible. Certainly it will not result if operation is delayed to a time when the urinary infection is too firmly entrenched,

and permanent damage of the tract has taken place.

CONCLUSIONS

Many urinary infections, especially of the bladder, are due to extra-urinary causes. In women, cystocele is the most frequent of these.

Rational treatment of such infections requires search for the underlying cause and the application of appropriate gynæcological treatment.

The results of treatment will largely depend on the measure of success achieved in supporting the bladder in the normal position and in such a way as to give free and unimpeded urinary outflow.

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THE RATIONAL SURGICAL TREATMENT OF CHRONIC ANTRAL DISEASE*

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FROM a position of relative obscurity in the field of rhinology, chronic maxillary sinusitis has grown in the last few years to one of great prominence. Operations of one kind or another for this disease are nowadays almost as common as those for chronic tonsillitis, while in 1918, only twelve years ago, our local hospitals fail to show a single record of operation for this trouble.

The responsibility for this change is largely due to the increasingly good work of our confrères in radiology, who have so simplified the diagnosis of this disease, that they have succeeded in convincing all but the most prejudiced, that a well-taken film is a diagnostic medium far superior to the older and notoriously unreliable methods of investigation,—transillumination and puncture with lavage. With the advent of radio-opaque iodized oil as a preliminary filling, the value of the x-ray has been further enhanced, so that it is now possible to tell at a glance not only if the sinus be diseased or not but also to say with a considerable degree of accuracy the type and degree of pathological change present in the lining mucosa—whether fibrous, polypoid, or purulent. (See Figs. 1 to 5).

The increasing use of the x-ray by the profession at large has resulted in the discovery that a very large percentage of sufferers from that *bête noir* of modern civilization, colloquially known as "chronic catarrh," with its nasal discharge, morning expectoration, throat droppings, recurring colds, and sore throats, are really victims of chronic sinusitis. In addition, we know now that many diseases previously classified as of obscure focal origin, and for which frequently teeth and tonsils have been vainly sacrificed, are really caused by the absorption of toxic products from the diseased mucosa of one or more of the para-nasal cells, of which the antrum is the largest and most frequently involved.

Among the more common maladies that may result from chronic sinusitis are: (1) chronic eye diseases, such as conjunctivitis, choroiditis, optic neuritis; (2) chronic otitis media, both catarrhal and suppurative, and acute and chronic inflammations of the mastoids; (3) chronic, non-tuberculous, pulmonary diseases, such as asthma, chronic bronchitis and bronchiectasis; (4) many cases of chronic indigestion, and malnutrition, largely due to the swallowing of infected mucus or pus; (5) chronic headaches and neurasthenia, and not a few of the graver types of mental disorders, more especially following ethmoiditis

* Read before the Western Ontario Academy of Medicine on January 24, 1930.

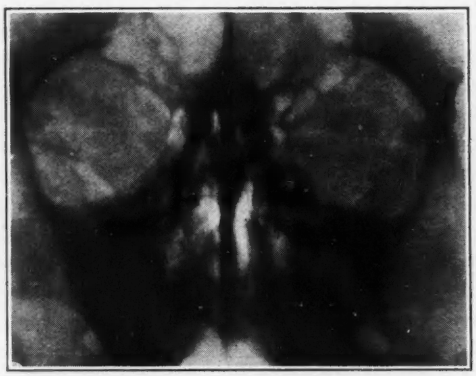

FIG. 1.—X-ray appearance of normal antra filled with iodized oil—no filling defects.

FIG. 2.—X-ray of antra containing iodized oil showing definite generalized fibrosis of both antral mucosæ.

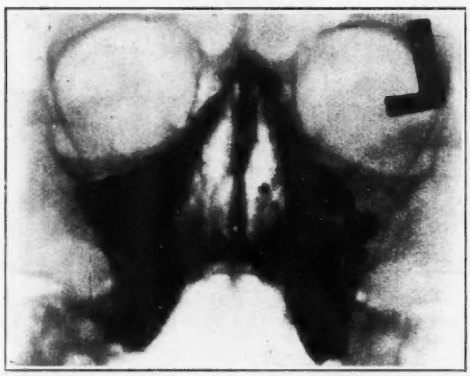

FIG. 3.—Both antra injected with iodized oil. The filling defects in the right indicate slight general fibrosis of the mucosa, while those in the left antrum were caused by a mixture of polyps and thick pus.

FIG. 4.—X-ray of chronically diseased antra, one only of which, the right, has been injected with iodized oil. The rounded curves in the filling defect are diagnostic of polypoid degeneration. Note that on account of absence of oil in the left antrum, the type of pathological change, though identical with that of the right, was not determinable before operation.

or sphenoiditis; (6) chronic arthritic and rheumatoid diseases.

TREATMENT

Having emphasized the rapidly growing incidence of chronic antrum disease, and having shown that this is not due to its greater prevalence in modern times but rather to its more frequent diagnosis, let us turn to a consideration of its treatment. Before doing so, however, it is essential that we have a clear appreciation of its underlying pathology. How else can we explain the radical clinical differences between the acute and chronic forms, the former being largely a self-limited disease, with characteristic local pain and tenderness, the latter showing little or no tendency to spontaneous resolution and no local signs except when exacerbated by a fresh infection? In acute sinusitis the lining

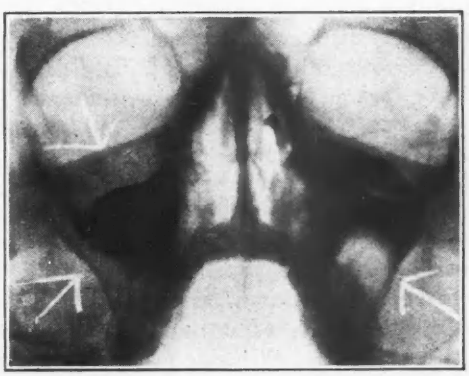

FIG. 5.—Both antra injected with iodized oil. The right shows marked filling defect, indicative of a greatly thickened mucosa on the orbital and outer wall. The left shows a large round defect at its base, caused by the presence of a discrete polyp.

mucosa of the affected cell becomes merely congested and œdematous, while in chronic sinusitis there is little or no congestion but a marked increase in the fibrous element of the deeper layers, often associated with polypoid degeneration, and more or less permanent loss of the protective ciliated epithelium. Hajek, in his recent text-book, divides this latter form into three types:— fibrous, polypoid, and suppurative.

While medical means have proved adequate in the treatment of most acute cases, they have, as was to be expected from the character of the histological changes, been merely palliative in chronic maxillary cases, so that surgical aid is necessary. On this subject we find the profession divided into three schools of teaching, the nasal, the naso-antral, and the extra-nasal.

THE INTRA-NASAL METHOD

The advocates of this technique contend that, because most of these cases complain of more or less nasal obstruction, all chronic sinusitis is the result of mechanical interference with normal nasal ventilation and drainage. They propose, therefore, to cure all chronic antral disease by the sub-mucous resection of deflected septa, the removal of hypertrophied turbinates, and the evulsion of polypi, when present.

Although this treatment undoubtedly relieves some patients of nasal stuffiness, at least temporarily, it totally ignores the presence of the real source of antral symptoms—the chronically infected and degenerated mucosa. In addition, its false premises are disclosed by the following facts. (1) Many antrum cases have neither bony or cartilaginous obstructions in the nose. (2) It is not uncommon (see Fig. 6) to find a chronically diseased maxillary sinus on the concave or unobstructed side, while that on the convex side of the deflected septum is normal. (3) The simple removal of nasal polypi is almost invariably followed by recurrence. (4) After the complete extirpation of all diseased mucosa, as will be described later in the extra-nasal method, many patients with quite marked septal spurs and deflections no longer complain of difficulty with nasal respiration, once the viscid, irritating discharge from the diseased antrum has been eliminated and the previously swollen erectile tissues of the turbinates have returned to normal.

There is another serious indictment of this method. Under usual circumstances the sub-mucous resection of the septum is, from the standpoint of post-operative reaction, a relatively minor surgical procedure. This, however, is all too frequently not the case, when done in the presence of a chronically infected antrum. What rhinologist of any experience has not had, especially before the x-ray became so generally used to detect the cases of latent sinusitis, the unpleasant experience of being called upon to combat, after what he considered was a perfectly executed septum resection, an unaccountably

FIG. 6.—X-ray of antra without oil, showing marked septal deflection to the right and a chronically diseased left antrum.

severe febrile reaction, a persistent secondary hæmorrhage, an infected septal hæmatoma, with its menace to the integrity of the nasal contour, or a virulent otitis media? The explanation of these complications is simple. The nasal packing commonly used to control hæmorrhage and hold the septal flaps together unfortunately acts as a cork to the nasal opening of the infected cavity, with a result similar to that which follows the temporary blocking of a discharging fistula anywhere else in the body; the virulence of the organisms in the infected sinus becomes greatly increased, and the bacteria find in the traumatized tissues of the septum an unresisting medium for further depredations.

THE NASO-ANTRAL METHOD OF TREATMENT

This method, known as the simple antrum operation, has probably the largest following. It was founded on the theory that chronic antral disease was due to an error on the part of the Creator in placing the normal opening of this sinus high up in the naso-antral wall, thus causing intermittent retention

of inflammatory secretions and secondary thickening of the mucosal lining. To correct this error and cure the sinusitis, the plan of making an additional opening into the antrum beneath the inferior turbinate, by chisel, punch, or rasp, was devised, and the interior of the sinus subjected to intermittent irrigations.

From the pathological standpoint this method has little rational sanction, except in those relatively few cases where free pus is present, and even then it often fails. I have a patient at present, who for private reasons was unable to go into the hospital. I opened her antrum intra-nasally two years ago and washed out considerable pus. She has continued to come weekly for irrigations, and while there have been periods when the return flow was nearly clear, large quantities of pus recur on the slightest provocation.

If polypi are present in the antrum, the use of this technique is indefensible. No rhinologist attempts nowadays to treat mucous polypi of the nose by irrigations, yet in this operation many eminent practitioners attempt to cure an identical, though far less accessible condition in the antrum, by similar inadequate means.

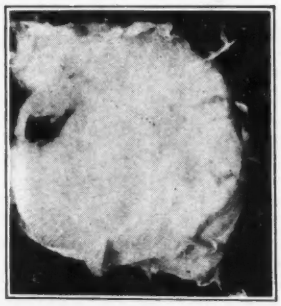

FIG. 7.—Fibrous cast of antral mucosa removed intact (natural size.)

This intra-nasal antrum procedure is responsible for another curious medical anomaly, which illustrates the remarkable way in which certain exploded, and presumably dead, surgical myths have a way of coming back to life. I refer to the injunction given to neophytes by practically all its leading advocates, not to be discouraged should the return of the first, or of even the second and third irrigation, be clear, as ultimately, if they but persist, they are assured of a rich return of (laudable!) pus. Apparently it has not been difficult to convince both themselves and their patients that this reaction, obviously the result of a secondary infection, is quite in order, but as time goes on and the discharge continues with but short intervals of relief, or if, as sometimes happens, this fresh infection spreads through the Eustachian tubes to the middle ear and mastoid, it must be increasingly difficult for the conscientious physician, not to mention his patient, to enthuse over such a method of treating chronic antral disease.

THE EXTRA-NASAL METHOD OF ANTRAL THERAPY

The advocates of this method consider that such possibly pre-disposing causes as mechanical nasal obstruction, or a non-advantageously-placed antral outlet, are quite irrelevant factors, once the antrum has become, by way of either nares or teeth, chronically infected and the lining membrane fibrosed or polypoid. (See Figs. 7 and 8). They feel that, *provided the nasal or remote symptoms are such as to demand operative interference,* the rational procedure is the complete extirpation of the infected mucosa. To do this, it is necessary to have access to all parts of the antral cavity. Adequate approach through the nose being impossible, the simple expedient of temporarily elevating the buccal mucous membrane and removing enough of the external antral bony wall was adopted.

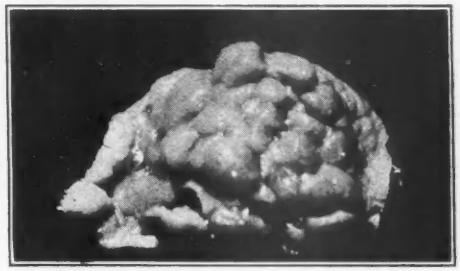

FIG. 8.—Showing early polypoid degeneration. (natural size.)

Although this technique was introduced thirty odd years ago by two pioneers in nasal surgery, Caldwell and Luc, the modern surgeon does not, like them, seek or expect complete ablation of the cavity, as is done in the Killian radical frontal sinus operation, but only sufficient bone is removed to permit the excision of all diseased tissues, and a flap of

nasal mucosa is turned into the antral cavity to provide a nucleus for its subsequent re-epithelization. It is therefore not correct to speak of this operation as a "radical" one. This method can be done under synergistic analgesia, or general anæsthesia, but the former has a marked advantage because of its relative bloodlessness. When ether is used, it should be administered by means of an intra-tracheal apparatus, to obviate the danger of aspirating infected material.

The clinical results, when the operation is thoroughly done, are very gratifying. The usual hospitalization of from five to seven days is a small price to pay for the permanent cure of such a persistent and far-reaching affection. The most serious error in its technique is the overlooking of portions of diseased membrane. The advice found in practically all modern text-books "to be sure to remove *only* the diseased parts of the mucosa," while theoretically praiseworthy, is not practical, as it is impossible in many instances to tell macroscopically where the diseased membrane begins and where it ends. An incomplete removal of the infected membrane is equivalent to a partial tonsillectomy; in some instances, no appreciable harm may follow, but in others, particularly in patients suffering from focal absorption, the result will be most disappointing. In some cases these overlooked portions become embedded in scar tissue and form walled-off abscesses. I have had to re-operate upon four such cases that had been done elsewhere, in order to relieve them of severe local pain. The safer plan, in my opinion, is to *remove all mucosa that can be elevated by blunt dissection,* because the normal membrane is so thin, and firmly attached to the underlying bone that its dislodgement by this means is practically impossible.

The fear expressed by the uninitiated, that the denudation of the antrum, in part or whole, may lead to a permanently discharging granulating area is quite baseless. In the nine hundred odd cases I have done, I have yet to see a single instance. Corroboration of this fact is shown in the experiments conducted by Knowlton and McGregor,[5] who, after removing the mucous membrane of the antra of several large dogs with sharp curettes, found later at post-mortem that there had been complete regeneration of the same within a period of three to six months.

While for reasons enumerated above, and because of the fact that I have personally suffered from the futility of many of the so-called conservative methods of treatment, I am a strong advocate of the extra-nasal operation for chronic maxillary sinusitis, yet I do not wish to leave the impression that I recommend its use indiscriminately in all cases, but only when the x-ray shows a very considerable increase in the mucosal density and there are definite clinical signs, not only local but constitutional. Furthermore, experience has shown that when there is an acute exacerbation of the infection present, as evidenced by local pain, slight fever and increase of nasal discharge, it is advisable to postpone if possible *all* surgical interference until these symptoms have abated and the local resistance to the organisms has become re-established.

The following case report demonstrates the value of this method even under most unfavourable circumstances.

CASE REPORT

Mr. G., aged 46, presented himself at the out-door clinic of the Victoria Hospital from Queen Alexandra Sanatorium, complaining of a discharge from both ears, and excessive droppings in the throat, which, he said, upset his stomach. He gave a history of having been under treatment for pulmonary tuberculosis for twelve years in different sanatoria, and that in addition to having four cavities in his lungs he had developed an active tuberculous lesion in one kidney, which necessitated his getting up seven or eight times at night to urinate. X-ray examination of his sinuses, the first that had been ordered, disclosed the fact that he had marked polypoid involvement of both antra and ethmoids. The risk of any operative procedure in his condition being explained to him, he departed. A month later he returned, saying that he would rather be dead than the way he was, and insisted on being given surgical relief. Three months after the extra-nasal antrum operation, he reported that his sputum, which previously had been averaging sixteen ounces a day, was reduced to three ounces; the discharge from his ears had ceased; he no longer had nocturnal frequency, and he had put on so much weight that he was forced to take exercise to control the same. The operation was performed in August, 1922, and, while still an ambulatory patient of the local sanatorium, he has, to date, had no recurrence of any of the above symptoms.

SUMMARY

1. Thanks largely to improved x-ray technique and its growing use for diagnostic purposes, it has become recognized that a large percentage of all chronic nasal catarrhs, and many remote systemic diseases, are directly due to chronic sinusitis the antrum being the largest and most frequently involved.

2. The nasal, and naso-antral methods of operating for this trouble seldom give permanent relief, and not infrequently they only serve to increase the disability.

3. The extra-nasal antrum operation, miscalled the "radical," is the only one which takes proper cognizance of the true character of the underlying pathological condition of chronic nasal sinusitis, *i.e.*, the chronically infected and permanently thickened mucosa, and, by completely removing the same, offers a safe and sure cure of an otherwise intractable disease.

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MULTIPLE ADENOPAPILLOMATA OF THE STOMACH WITH REPORT OF CASE SHOWING VARYING DEGREES OF MALIGNANCY*

BY F. D. ACKMAN, M.D.,

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PRIOR to 1909 multiple polypoid adenomata of the stomach had been recognized only at post-mortem, and the condition was therefore thought to be very uncommon. Modern advances in diagnostic laboratory methods, particularly the routine roentgenological examination of the stomach, have however shown that the condition is not rare and can be recognized clinically.

Cruveilhier reported a case and gave a clear picture of gastric polyposis in 1833, but it was not until 1885 that Brissard first properly classified the condition as polyadenomata. Soon after this, in 1888, Menetrier, in a comprehensive study, divided the disease into two main types, polyadenoma "polypeux" and polyadenoma "en nappe", and this classification is still generally accepted. Menetrier was also the first to advance the theory that the disease is due to chronic gastritis. Hauser, in 1895, made an important contribution to our knowledge of the condition, and supported Menetrier's view regarding its cause. It was not however until 1909 that Wegele made the first ante-mortem diagnosis. He observed a case at operation, performed a biopsy, and did a successful gastro-enterostomy. Previous to this there had been but 49 cases reported, all of which were post-mortem findings. Since then, our knowledge of the subject has rapidly increased, and of the 39 cases reported since 1909, including the case here described, more than two-thirds were diagnosed clinically.

Brunn and Pearl, in 1926, in an exhaustive article (*Surg, Gyn. & Obst.* **43**: 559, 1926), covered all the literature on the subject up to that date, made a comprehensive analysis of the 84 proved cases, and added 5 of their own. This article is particularly commended to the reader for its detail and very complete bibliography. Since Brunn and Pearl's paper, 3 more cases have been reported, 2 by Strauss, Meyer and Bloom, and one by Lamas. Among the other outstanding articles on this condition will be found those of Verse, Wechselmann, Chosiojeff, Konjetzny, Heinz, Epstein, and Eliason and Wright.

INCIDENCE

The condition is considered to be rare, but there is a wide diversity of opinion regarding its frequency. This, as Brunn and Pearl state, may be partly due to the inclusion by some authors of cases of gastric polypi with those from other parts of the gastro-intestinal tract, or partly, as emphasized by Strauss, Meyer, and Bloom, to a misconception of the meaning of the term "polyp". To illustrate the discrepancy in incidence statistics; Eliason and Wright found one case in 8,000 autopsies at the Philadelphia General and University of

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Pennsylvania Hospitals, and Balfour one case in 8,000 gastric operations at the Mayo Clinic. On the other hand Tilger found 14 cases in 3,500 autopsies, Epstein 10 cases with 3 or more polyps in 600 autopsies, and at the Oberchou Krankenhaus there were 4 cases in 7,500 autopsies. Verse reports 5 cases in a series of 55 from the whole gastro-intestinal tract. Eliason and Wright found that the lesion comprised 1.9 per cent of all benign gastric tumours. Carmen recognized 2 cases in 50,000 gastric roentgen-ray examinations.

The age incidence also varies according to different authors. In analyzing all the reported cases the following figures are established. The youngest case was 20 years, the oldest 82 years, and the average 53 years of age. Between 20 and 30 there were 3; between 30 and 40, 11; between 40 and 50, 8; between 50 and 60, 21; between 60 and 70, 17; between 70 and 80, 8; and over 80, 2. The ages in 8 cases were not given.

Although many authors state that the condition is more common in males than in females, the figures actually show females 31, males 32, and sex not given 23.

ETIOLOGY

Two main theories have existed regarding the origin of these tumours. (1) Wechselman and Ribbert believe that adenopapillomata are of congenital origin, resulting from *anlagen* which become separated during early development. This theory has received much support, particularly since it has been fairly well established that there is a definite familial tendency to the disease. Mayer, Hertz, Mueller, Roth and Rosenberger all support this view. Brunn and Pearl on the other hand, state that in their series there was not a single case in which heredity played an unquestioned part. Wechselmann admits that chronic irritation can produce epithelial overgrowth, but insists that polyps thus formed are not true papillomata, being hyperplastic in character and not neoplastic. (2) By far the greater number of writers, including Cornil, Verse, Hauser, Eliason and Wright, Basch, Strauss, Meyer and Bloom, believe chronic gastritis to be the immediate underlying factor. Menetrier and Meulengracht stated that all cases showed this as an accompanying condition. This statement is not completely borne out, although it is true that the majority of the cases do show chronic gastritis. In our own case it was marked. Konjetzny noted gradual transformation from chronic gastritis to adenoma and even to carcinoma. Verse, while strongly supporting the inflammatory theory of origin, admits a familial tendency and even the possibility of a congenital cause. He states that, granting the latter to be true, many widely different types of irritants acting in a susceptible field may result in the same type of lesions. Otto's case, in which an adenoma was found surrounding a splinter of wood, is noteworthy. Hauser believes that degeneration of the epithelial lining of the stomach precedes the chronic inflammatory changes. Other possible causes that have been mentioned are alcoholism, atheroma of the arteries, syphilis and tuberculosis.

Huber attempted to show that these polyps are the result of a general systemic lymphatic hypertrophy, while Brunn believes that metaplastic changes take place, lowering mucosal resistance and allowing bacterial invasion. Tsukiasis noted marked epithelial hypertrophy in the stomachs of two monkeys suffering from ascaris lumbricoides, while many instances of a somewhat similar character have been noticed both in man and in animals. The experiments of Fibiger and Wassink are of interest. Working independently, they produced adenomata in the stomach of rats by feeding a certain nematode whose intermediate host is the cockroach. The mature parasite grows in the gastric wall of the rat and results in papillomatous formation.* Ishabashi and Ohtani produced polyps by injecting coal tar into the gastric mucosa of rats. All the experimental evidence lends weight to the "acquired" theory, and proves that many different irritants may excite the same tissue response. Whether or not a hereditary or congenital tendency pre-exists still remains an open question, but in any case it is of secondary importance. Researches in recent years have only served to emphasize the rôle played by irritants in the formation of tumours. In this connection should also be mentioned the work of

* Dr. L. J. Rhea, Pathologist to the Montreal General Hospital, informs me that he has examined the gall bladder of a wild mink which contained many small round worms and showed a very diffuse benign papillomatosis.

Sampson Handley, who believes that lymphstasis plays an important part in the causation of new growths.

PATHOLOGY

In contrast to the disagreement regarding the etiology of the lesion is the unanimity of opinion regarding the pathology. Menetrier's classification of polyadenoma "polypeux" and polyadenoma "en nappe" is almost universally accepted. The first group, polyadenoma "polypeux", is characterized grossly by pedunculations and marked lobulation, while cystic dilatations of the glands are an almost constant finding. This type, which is the more common, is thought to be the result of hypertrophic involvement of the cells at the neck of the ducts of the glands, with resultant blocking. Far more uncommon is the polyadenoma "en nappe", of which there are only 7 previously reported cases; the present case making the eighth. These tumours are mostly sessile flattened plaques, composed of closely packed folds of hypertrophied mucosa, rarely containing cysts, and more rarely still pedunculated. Only, as in our case, where mechanical factors exert traction on the tumour, is a pedicle produced. This type represents a true hyperplasia of the cells at the fundal end of the gastric glands.

Several cases have been described in which both types of tumour were present. Hayem described a third type in which the glands are of Brunnerian character, and thinks they are due to duodenal cell-rests in the stomach.

All types of the tumour occur most frequently in the distal third of the stomach and on the greater curvature. They may vary in numbers from 3 or 4 to as many as 800. Sometimes a large polyp is seen surrounded by a group of smaller ones. The polyps vary in size from a few millimetres to tumours filling the stomach. All are fairly soft. In colour they vary from pale grey to reddish brown, depending on their vascularity, the amount of degeneration, and whether or not hæmorrhages are present. Punctate hæmorrhages are frequent, and ulceration of the surface is fairly common. There is usually a considerable amount of thick mucus, of egg-albumin consistency, covering the tumours and the surrounding gastric mucosa. This finding is described as characteristic. The gastric wall itself is usually thickened and congested.

Microscopically the differences between the two types of tumour are marked. In the group known as "polypeux" there is a well developed elongated stalk of connective tissue arising from the submucosa, and supporting a fairly orderly adenomatous pattern of glands lined by a single layer of columnar, cuboidal, or flattened epithelium. The lining cells generally contain much mucus and the nuclei are basally placed. The dilated glands are filled with mucus and their epithelium is very much flattened. Mitotic figures are very rare. The blood vessels of these tumours are numerous and thin walled. In the second group, the "en nappe" variety, glandular arrangement is more irregularly adenomatous, there is little or no tendency to cystic dilatation, the epithelium is arranged in a single layer, but is generally of a higher columnar type and shows more tendency to hyperplasia, particularly at the edge of the tumour. In this type there may sometimes be, as is well described by Verse, two distinct types of gland occurring side by side in the same tumour: one lined by mucus-filled epithelium, with pale-staining cytoplasm and basally placed flattened nuclei, while the other shows cylindrical cells with a more eosinophilic cytoplasm and nuclei that are more rounded or oval, and more vesicular. This condition is well illustrated in our case. Mitotic figures are also rare in this type.

In both types of tumour inflammatory reaction is extensive. For the most part, plasma cells and small round cells predominate, but in some areas polymorphonuclear leucocytes may be so numerous as to give the appearance of abscess formation. This condition is also well shown in the case here reported.

Rindfleisch, in 1878, first called attention to the occurrence of small round hyaline-like bodies in the supporting tissue. They have not been found in all cases, and are absent in ours. Rusk thinks they are due to degenerated plasma cells. There are many theories regarding their origin. They are seen in many other pathological conditions, as well as in comparatively normal tissues, and are not to be considered as characteristic of stomach papilloma. In the laboratory of the Montreal General Hospital great numbers have recently been seen in

a simple polyp of the nose and in a benign leiomyoma of the uterus.

Malignant transformation was found in 12 per cent of Brunn and Pearl's series. It was present in both of the cases reported by Strauss, Meyer and Bloom. Mills found malignancy in 4 cases out of 20. Rosenbach and Disque claim that malignancy occurs more frequently in the "en nappe" variety of tumour, and there appears to be good ground for support of this view, as it was present in at least three of the previously reported 7 cases of this variety and is one of the features of our case. Malignant changes are usually described as commencing in the glands at the periphery of the tumour, but whether from the glands in the adenoma itself, or from the compressed glands in the adjacent mucosa, has not been determined. Lockhart-Mummery and Dukes, in describing a similar lesion in the colon and rectum, express the belief that pressure causes derangement of the surrounding mucosal glands, which first results in so-called "collar catarrh" and later in malignant change. We were not able to determine, in our case, the exact cells from which the large cancer developed, but we did establish the origin of the cells which infiltrated the stem of one of the polyps.

SYMPTOMATOLOGY

As gastric polyposis may run a long course without symptoms, and so many cases have been incidental autopsy findings without preceding gastric disturbances, characteristic symptoms can hardly be said to exist. On the other hand, some cases, notably Wegele's, have had gastric symptoms lasting over 20 years. When present, the symptoms are variable in character and degree, depending upon the kind of tumour, its location and size. Epigastric discomfort, with a sensation of pressure or weight, is said to be the first symptom, and this subsequently goes on to definite pain. This epigastric pain is the commonest symptom, being present in 27 of the cases. The pain may be burning in character, or, less frequently, colicky. In some cases food has been found to relieve it, in others it has had no effect, while in still others, it has aggravated the symptoms. Nausea occurs fairly frequently, and vomiting, apart from hæmatemesis, occurred in 1.7 per cent of the cases. The vomitus is characterized by the presence of thick viscid mucus and sometimes blood, while occasionally polypoid tissue has been found in it. The development of anorexia, anæmia, asthenia, or constipation, is about as frequent as is vomiting. Hæmatemesis occurred in 8 of the cases, and was the primary symptom in four of these. In the case here reported severe hæmatemesis occurred twice. However, fatal bleeding has never been known in these cases. Occult blood is more frequent, having been found in 12 cases, and tarry stools have occasionally been noted. As achlorhydria is almost always present, diarrhœa is a frequent finding, having been reported in 15 cases.

Pedunculated tumours situated near the pylorus may be prolapsed through the orifice, and have been known to cause either acute or chronic obstruction. In our case a pedunculated polyp at the pylorus had prolapsed into the duodenum. How much of the symptomatology is due to the tumours themselves and how much to the associated gastritis cannot be definitely determined.

DIAGNOSIS

The comparative rarity of the lesion, the absence of characteristic symptoms, and the earlier lack of proper laboratory facilities are undoubtly the reasons why this condition has been so frequently overlooked clinically. Since the first clinical diagnosis by Wegele in 1909, 39 proved cases have been reported, of which, it is encouraging to note, only 15 have been found postmortem. Of the remaining 24 cases, 10 were diagnosed at operation, 9 by roentgenography, 3 by finding tumour tissue in the gastric washings, and 2 by gastroscopy. All of the 9 x-ray diagnoses have been made since 1919, when Balfour reported the first case to be diagnosed by this method. Particular stress should therefore be laid on this method, though even here confusion may occur, as is illustrated by one of Brunn and Pearl's cases. In their article is found a personal communication from Ruggles on the x-ray features of polypoid disease. Moore, Kalisch, Gassman and others have also made important contributions in this connection. All of these writers state that, as would be expected, the greatest difficulty is met with in the borderline cases.

Gastric analysis also affords help. Absence of free HCl. and a low total acidity were found

in over 90 per cent of the cases. Tumour tissue, as before mentioned, has also been found occasionally in stomach washings. The differential diagnosis of such fragments is often extremely difficult, just as it is in fragments of papilloma in other locations. Large quantities of thick viscid mucus are said to be characteristic, and occult or manifest blood has been found in over half of the cases.

Gastroscopy offers an important aid in the diagnosis. Schindler reported the first case diagnosed by this method in 1922, and Lamas has recently added another.

Anæmia may be marked, though the white cell count is usually normal. The principal conditions which must be differentiated are chronic gastritis, gastric ulcer, carcinoma and syphilis.

PROGNOSIS AND COMPLICATIONS

So many of the cases have been found only at post-mortem examination that statistics in this connection are of little value. However death has, rarely, been due to the uncomplicated lesion. Malignant changes are not uncommon, having been found in approximately 15 per cent of all the cases. The microscopic recognition of early malignant changes occurring in papillomata of the stomach offers much difficulty, but not more so than in papillomas in other locations. Brunn and Pearl lay down the rule that it must rest on the actual invasion of the submucosa. On the other hand, Miller reported a case of unquestionable metastases from these polyps, in which he was unable to demonstrate any deep invasion of the growth.

Of other possible complications, that of pyloric obstruction is the most important. This may be either acute or chronic, while sometimes there is a definite ball-valve action. Gastric hæmorrhage occurs, but fatal hæmorrhage is unknown.

TREATMENT

On account of the danger of malignancy, the lesion should be completely excised, partial resection of the stomach being the operation of choice. The exact surgical procedure will usually be determined by the extent of the involvement. In this connection we would emphasize the fact that a large benign tumour should rarely be considered inoperable solely on account of its size. Should there be outlying polypi they too should be excised and their bases cauterized. As regards other methods of treatment only a word need be added. Douglas used radium is one case unsuccessfully. Brunn and Pearl employed deep x-ray therapy and noted some improvement. On the other hand, Struthers reports a case in which increased growth followed x-ray treatment.

The following typical case of gastric polyadenomata, or adenopapillomatosis, of the "en nappe" variety, is of interest, not only on account of the comparative rarity of this disease, and the fact that frank malignancy had developed in one of the tumours, and that there are early malignant changes in another, but also because of the roentgen-ray diagnosis, the surgical treatment, and the results.

CASE REPORT

M.P., a married female, aged 58 years, first came under the observation of Dr. E. M. Eberts on October 29, 1925, suffering from a toxic adenoma of the thyroid gland. The enlargement of this gland had been noticed for 12 years previously, but she had had toxic symptoms for only 5 years. She gave a history of a severe gastric hæmorrhage in May, 1925. This had, however, been atrributed by her family physician, to hypertension, her blood pressure being 260/110. On November 5, 1925, she was admitted to the Montreal General Hospital for thyroidectomy. Shortly after admission she developed acute cardiac decompensation with auricular fibrillation. With rest in bed and digitalis, compensation was restored in a few days, but her blood pressure on November 16th was 220/100. On this date 500 c.c. of blood were removed by phlebotomy and her blood pressure dropped to 190/45. The following day a right lobectomy was carried out under local anæsthesia. Recovery from the operation was uneventful. On leaving the hospital on November 28, 1925, her blood pressure was 190/90. Following her discharge her general condition continued to improve, though her systolic blood pressure remained about 200.

About the end of June, 1926, the patient had a second severe gastric hæmorrhage and was confined to bed for two weeks. In September of the same year she reported for examination. Her blood pressure at this time was found to be 210/110. She felt well. In November 1927, a report of continued good health was received.

In January, 1928, the patient consulted her physician for loss of strength and a loss of 10 lbs. in weight. At that time she complained of occasional regurgitation of food after meals. In April a barium series showed a filling defect, 6 cm. long and 3 cm. vertically, on the greater curvature of the stomach, lying chiefly to the left of a line in continuation of the vertical portion of the lesser curvature. On April 27, 1928, she again consulted Dr. Eberts, who found an indefinite mass in the left upper quadrant. The lower border of the liver was at the level of the umbilicus, but no nodules could be felt. Her weight was 114 lbs. She was admitted to hospital the same day.

Laboratory findings. An *Ewald test meal* gave the following results: quantity, 50 c.c.; total acidity, 18

per cent; free HCl, 0; no visible or occult blood; no starch granules; a few Boas-Oppler bacilli.

Blood examination.—Red blood cells, 4,100,00 per c.mm.; white blood cells, 6,000; hæmoglobin, 60 per cent.

Barium series.—The report from Dr. Ritchie, roentgenologist to the hospital, is as follows: "There is evidence of a constant filling defect in the greater curvature in the pars media, and towards the pyloric end of the stomach. There is some widening of the pyloric orifice, and in the cap of the duodenum there is an irregular filling. This latter condition is very suggestive of a papilloma which has passed through the pyloric orifice into the duodenum. There is no definite evidence of disease of the cap itself. The filling defect on the greater curvature, while suggestive of a malignant growth, might be due to a similar condition to that seen in the cap. However, the weight of evidence is more in favour of the former." (See Fig. 1).

FIG. 1.—Roentgenogram of stomach (barium series), showing irregular filling defect in the duodenum (A), resulting from the prolapsed pedunculated papilloma, and the larger defect (B) in the greater curvature caused by the carcinoma.

The clinical diagnosis was benign papilloma of the duodenum and papilloma of the stomach, with probable malignant change.

Operation.—On May 1, 1928, the patient was operated upon by Dr. Eberts under local anæsthesia. The abdomen was opened through a right rectus incision. In the first portion of the duodenum a freely movable papillomatous mass was felt. In the wall of the greater curvature of the stomach, at the site shown by the roentgenogram, there was a firm mass about 6 cm. in diameter with considerable puckering of its peritoneal surface. Several small nodules were also felt in the gastric wall in the region of this larger mass. There were numerous slightly enlarged firm lymph nodes in the sub-pyloric and in the gastro-hepatic omentum. A partial gastrectomy was performed, the proximal line of excision being well above the larger tumour, and the distal line through the duodenum about 5 cm. from the pylorus. A retro-colic anastomosis between the stomach and jejunum was performed.

The patient's condition during the operation was excellent. There was neither vomiting nor retching, and it is interesting to note that she asked for food before leaving the operating table. Post-operative recovery was uneventful. She left the hospital on May 15, 1928, fourteen days after operation. Her convalescence was rapid. On October 28, 1928, she reported for examination stating that she felt much better than for some time past. Her appetite was good and her bowels regular, while she had no gastric symptoms whatever and no abdominal pain. At a recent examination this year a similar satisfactory condition was found.

Pathological examination. — (M.G.H., S-28-945) — "The specimen consists of the distal half of the stomach and 5 cm. of the first part of the duodenum. Situated on the anterior surface and on the greater curvature there is an irregularly outlined firm rounded elevated area, 6 to 7 cm. in diameter. Near this large mass there can be felt in the mucosal surface several small nodules. The proximal excision line is 4 cm. from the border of the large mass. The surrounding blood vessels are dilated and the adjacent gastric wall puckered. The attachment of the gastro-colic omentum crosses the main tumour and has a puckered appearance. In the resected portion of the duodenum a second mass about 4 cm. in diameter is felt. This is freely movable and can be pushed through the pylorus into the stomach with very little difficulty. The lymph nodes in the gastro-colic and gastro-hepatic omenta are somewhat enlarged and some are fairly hard.

The specimen was next opened along the lesser curvature of the stomach. Situated on the greater curvature, more anteriorly than posteriorly, there is a round irregularly elevated, sharply outlined growth, 6 to 7 cm. in diameter. The margin is raised in some places to the height of 1 cm. above the mucosa and in places is overhanging. The surface of this tumour is rough, irregular, patchy greyish red in colour and shows small areas of ulceration.

Surrounding the larger growth, and at various distances from it, are seven flattened sessile polypoid projections varying from 0.5 to 1.5 cm. in diameter and up to 0.5 cm. in height. Their surfaces are irregular and reddish pink. These tumours are firm and move freely with the mucosa on the deeper gastric coats.

Attached to the posterior surface of the pyloric canal, and 1 cm. from the ring, there is a pedunculated reddish, irregularly lobulated growth, measuring 1.5 by 3 by 6 cm., which is divided into two parts by a deep cleft. One portion is larger than the other but both are attached to a common pedicle 3 cm. long, 3 cm. wide and 0.3 cm. in thickness. This pedicle is sufficiently

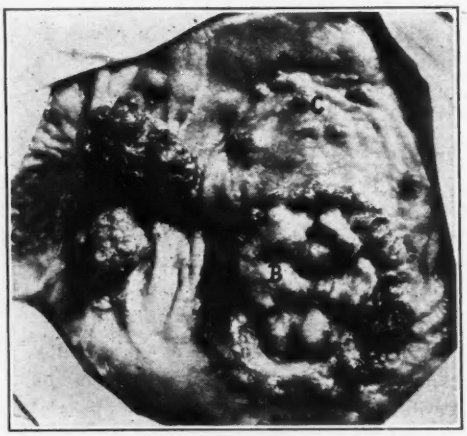

FIG. 2.—Wax moulage (by Miss Hortense Douglas) of resected portion of stomach and duodenum showing: A. a large pedunculated papilloma arising near the pylorus; B. a large carcinoma in the greater curvature; C. smaller polyps.

long to permit the whole papilloma to be extruded through the pyloric sphincter.

The mucosa of the stomach generally is greyish pink, with fairly prominent rugæ. The surface is coated with thick mucus, particularly marked near the main tumour. The gastric wall is thickened throughout. (See Fig. 2).

Anatomical diagnosis.—Carcinoma of the stomach; multiple adenopapillomata of the stomach; chronic gastritis."

The following microscopic description is based upon the examination of many sections, stained by various methods.

Sections of the large polyp at the pylorus.—All of these sections show a diffuse adenomatous structure arranged on a fairly vascular stroma of fibrous connective tissue. The main pedicle contains smooth muscle fibres and connective tissue, both of which are continuous with similar tissues in the submucosa of the gastric wall. The adenomatous gland formation is irregular and the alveoli fairly narrow, none of them being dilated. Many of the more superficial glands contain an exudate of endothelial cells, lymphocytes, and plasma cells, with a few polymorphonuclear leucocytes. The alveoli are lined throughout by a single layer of epithelium, of which there are two general types. For the most part the lining cells are high columnar, with finely granular, rather eosinophilic cytoplasm, and large round, somewhat vesicular nuclei placed toward the base of the cell. In some areas, however, the glands are entirely lined by cylindrical cells with pale staining cytoplasm containing considerable mucus, and with deeply staining nuclei which are ovoid or flattened in shape and lie in contact with the basement membrane. The basement membrane generally is intact, and nowhere is there any tendency to hyperplasia beyond a single layer of cells. (See Fig. 3).

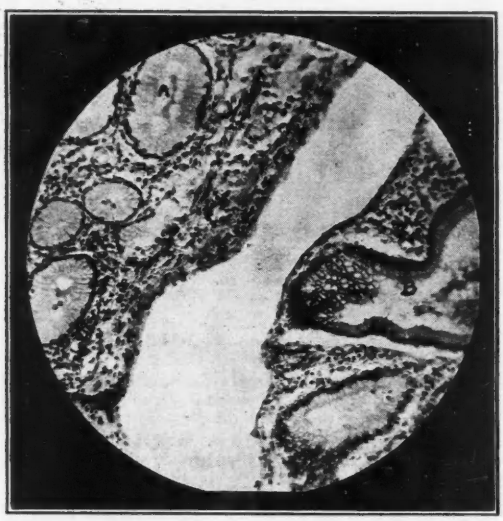

FIG. 3.—High power microphotograph of section from the pedunculated papilloma showing two different types of glandular epithelium: A. high cylindrical epithelium containing mucus, with a small amount of pale staining cystoplasm and flattened basally placed nuclei; B. columnar epithelium, with darker staining granular cytoplasm containing little or no mucus and with larger more vesicular nuclei.

In addition to these two general types of epithelium there are a few areas near the main stalk where gland formation is much less perfect, and the basement membrane poorly defined. In a few places these glands extend down into the stalk itself, where they occur in small groups, surrounded and separated by bands of connective tissue containing many young fibroblasts, many endothelial cells and a goodly number of other mononuclear cells, chiefly of the plasma cell variety. There are also present in the stalk a few small groups of epithelial cells which show little or no tendency to gland formation.

The epithelial cells in and near the stalk are of a low columnar type with, for the most part, a darkly staining granular eosinophilic cytoplasm and irregularly placed large vesicular nuclei. From the above it will be seen that the appearance and arrangement of the epithelial cells in the stalk of the polyp is that of early carcinoma. (Fig. 4).

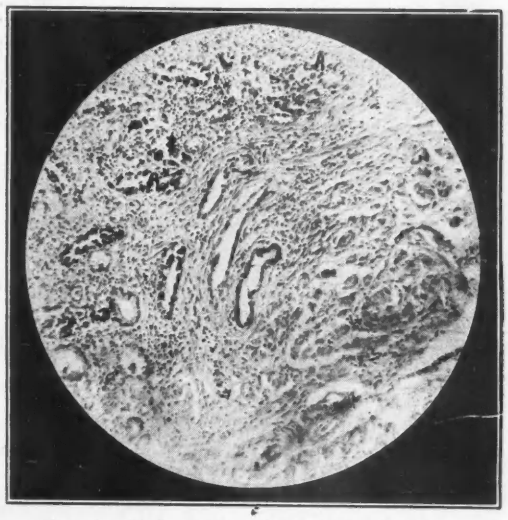

FIG. 4.—High power microphotograph of section through stalk of the pedunculated papilloma, showing invasion by irregular poorly formed glands and groups of immature epithelial cells. (A).

Sections from the smaller polyps.—These show a more or less typical true adenomatous formation arranged on a sessile stalk of fibrous connective tissue. The stalk is continuous with the submucosa, and finger-like projections branch off, forming the framework upon which the adenomatous tissue rests. The glands are lined by a single layer of epithelium, which, as in the larger polyp just described, is of two general types. The predominant type of epithelium is the same as in the larger polyp. There are, however, glands whose epithelium is of the mucous type and some of these contain mucoid material.

In contrast to the polyp at the pylorus, none of these smaller polyps show epithelial invasion of their stroma, though in a few sections well formed glands are seen lying close to the main stalk between large bundles of connective tissue. Distributed through the glandular tissue are occasional lymph follicles whose germinal centres are prominent. There is also a fairly diffuse infiltration with plasma cells, lymphocytes, and polymorphonuclear cells. Though the mononuclear cells predominate, there are superficial areas where the cells are mainly polymorphonuclear, and some of the glands are filled with these cells. The vascular supply consists of very thin-walled blood vessels traversing the stroma. (Fig. 5).

Sections from carcinomatous area.—Transverse sections were made through the whole diameter of the large ulcerated tumour and the adjacent gastric wall. The gastric wall surrounding the tumour is generally thickened and covered by a mucosa which shows marked chronic inflammatory changes, some atrophy, and along one border especially, very wide dilatation of the glands with mucoid material. Here and there are collections of lymphoid follicles. There is considerable œdema and some small round-cell infiltration of the submucosa. The muscular layers are hypertrophied, and they also show scattered areas of this type of infiltration. The serosa

FIG. 5.—Planar photograph of a section of one of the smaller polyps, showing typical adenomatous formation of epithelium arranged on a sessile stalk (A) of connective tissue.

is intact. In none of the sections could epithelial cells be found invading the gastric wall beyond the edge of the tumour.

The outer margin of the tumour is sharply defined by a ring of dense fibrous connective tissue, which is broadest in the mucosal plane but extends deeply into the muscularis. The fibrous ring is diffusely infiltrated with small round cells. In places the mononuclear cells predominate, but there are areas, particularly on the tumour side, where polymorphonuclear leucocytes are so densely packed as to give the appearance of early abscess formation. On the outer side of this connective-tissue ring, the line of contact between tumour cells and normal mucous membrane is sharply defined.

The tumour itself consists of irregularly formed masses of glandular tissue with a moderate amount of connective-tissue stroma. For the most part this is fairly well vascularized, but towards the surface vascularity is poor. The new growth entirely replaces the normal mucosa, the submucosa, and, to a considerable extent, the muscularis. In some places the latter is almost completely replaced by fibrous connective tissue, diffusely infiltrated with small round cells. The base of the tumour is thus formed by the remaining muscularis and a zone of fibrous connective tissue lying just under the serosa. In places this fibrous tissue is infiltrated by groups of tumour tissue. There are large areas of necrosis and ulceration on the free surface of the tumour. In these areas necrotic tissue is interspersed with a densely packed exudate of inflammatory cells, chiefly polymorphonuclears. There is comparatively little reactionary granulation tissue.

The glands of the tumour are lined almost entirely by a single layer of epithelial cells, generally of a fairly high columnar type with granular eosinophilic cytoplasm and large elongated variously shaped nuclei situated irregularly in the cells. Many of the nuclei are vesicular, while others are hyperchromatic. Very few mitotic figures are seen, and only in a very few places is there any tendency to heaping up of cells within the alveoli. The basement membrane throughout is fairly distinct. Nowhere are there any invading strands or bands of tumour cells, without alveolar formation. (Figs. 6 and 7).

FIG. 6.—Planar photograph of a transverse section through the carcinoma, showing invasion of the deeper gastric coats which in places are completely replaced by tumour tissue.

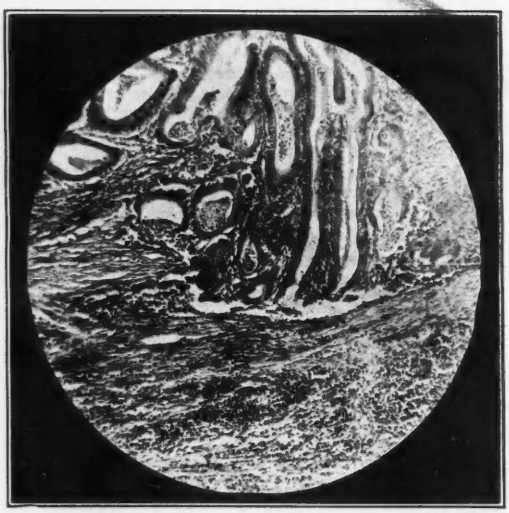

FIG. 7.—High power microphotograph of a section of the carcinoma, showing the deep invasion of the muscularis by tumour tissue.

Sections of the gastric wall remote from the carcinoma show thickening of all the coats. The gland formation in the mucosa is very irregular and many of the alveoli are dilated with mucus. In all sections there is hyperplasia of the lymphoid follicles, and a diffuse cellular infiltration of the mucosa which, in some areas, shows a predominance of polymorphonuclear leucocytes. There is also a general increase in fibrous connective tissue in the mucosa. The submucosa shows œdema, increase in fibrous tissue and a few scattered areas of small round-cell infiltration, while the muscularis generally is hypertrophied. (Fig. 8). Many sections of the stomach wall were examined in the hope of finding the earliest evidences of adenoma formation, but without success. Of interest was the finding in one of these sections of a minute benign fibromyoma in the muscularis mucosa.

Sections were made from all the lymph glands that

could be found in the specimen. In all 15 glands were obtained, including 8 from the inferior gastric group, 3 from the sub-pyloric group, and 4 from the superior gastric group. All of the glands showed prominent germinal centres; some also showed marked endothelial hyperplasia; and a few of the inferior gastric group showed a considerable diffuse increase in fibrous connective tissue. In none of the many gland sections examined could any tumour tissue be found.

Microscopical diagnosis. — Multiple gastric polyps one of which shows early cancer; carcinoma of the stomach; chronic gastritis.

FIG. 8.—Planar photograph of a section of the gastric wall remote from any tumours, showing chronic gastritis with increased mucus production, many of the glands being dilated with this material.

DISCUSSION

This case is fairly typical of the condition described by Brunn and Pearl as "adenopapillomatosis." Several features deserve special comment. In the first place there was an absence of gastric symptoms prior to hæmatemesis. This important symptom was attributed to hypertension without further investigation. Had x-rays been employed at that time it is probable that the condition would have been recognized as one of benign tumour. While the x-ray pictures were characteristic it should be noted that the smaller polyps were too flat to show in x-ray plates.

The situation of the large pedunculated polyp and its prolapse through the pylorus without leading to obstructive symptoms are interesting features. The formation of the long pedicle resulted from the peristaltic push. Prolapse of such a large tumour through the pylorus has been described before, as in Wade's case, but never without some obstruction. Possibly the absence of obstruction may be accounted for by the length of the pedicle. In other locations in the stomach such marked pedunculation would not seem to be consistent with the "en nappe" type, but histologically this large polyp, like the smaller ones, falls within this group.

Malignant change in gastric polypi, as before mentioned, is not uncommon. All stages of this change have been described by Verse and by Hauser, but it is extremely rare to find, as in this case, multiple carcinomata. Lockhart-Mummery and Dukes, in commenting on papillomatosis of the colon, ascribe the infrequency of multiple carcinoma to an immunity or unsusceptibility induced by the presence of one carcinoma. They call attention to the observations of Murray who showed that whereas a single primary carcinoma may be produced experimentally in a susceptible animal without great difficulty by the proper use of tar, it is very difficult to produce a second tumour in the same animal.

SUMMARY

1. Reports of 88 cases of multiple gastric adenopapillomata have been found in the literature, and one more case is here added. These figures probably do not represent the actual frequency of the condition.

2. The lesion is classified pathologically under two heads: polyadenoma "polypeux" and polyadenoma "en nappe".

3. Polyadenoma "en nappe" is much rarer, only 7 cases having been reported previously. The eighth is described herein.

4. The condition is generally thought to be inflammatory in origin, though a congenital origin and a familial tendency have been noted by several writers. The experimental production of these tumours by irritants is very significant.

5. There is no characteristic symptomatology, though epigastric pain is the most frequent symptom. Hæmatemesis is occasionally the first sign.

6. Of laboratory diagnostic aids the roentgenogram probably comes first, though even this is apt to be misleading. Achlorhydria is practically a constant finding and when combined with myxorrhœa is considered very suggestive.

7. Malignant transformation is quite common, but is rarely multiple. The latter fact is thought to be due to immunity. Our case showed, in addition to a large carcinoma, malignant changes in the stalk of a pedunculated adenopapilloma at the pylorus.

8. Treatment should be surgical.

The comprehensive bibliography of this paper will be found in the author's reprints.

ACUTE INTESTINAL OBSTRUCTION INVOLVING THE APPENDIX

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SOME few weeks ago I was called in to see a doctor friend. Over the telephone he stated that he either had intestinal obstruction or a very acute appendix. Twenty hours before he had developed a slight pain in the abdomen, just above and to the left of the navel. He immediately took two doses of magnesium sulphate, and in the course of the afternoon and evening took four enemas. At the time of the examination the abdomen was soft, moved on deep breathing, but not freely, and was not resistant to palpation, except just about the navel. The pain was not severe, but was of a griping type, and was centred about the navel and to the left of it, and he said it seemed "deep in". The temperature was normal; the pulse 82 per minute; there was no tenderness per rectum, but the man looked ill. The white blood count was 12,500.

Operation without delay was advised. On admission to hospital he said the pain had gone, but he had deep soreness. The abdomen was opened close to the navel because of the site of the pain. The cæcum was found in the midline below the navel and an acutely gangrenous appendix, lying entirely to the left of the navel and firmly adherent to the root of the mesentery, was found. The appendix was an enormous one, of a deep angry red colour from base to tip, and was so distended with fæcal content that it was almost impossible to be sure of its attachment to the cæcum. The area of the cæcum about the base of the appendix and the mesentery of the appendix were gangrenous and œdematous. The appendix could not be touched with forceps, lest it should rupture, and it was removed with difficulty, but without soiling or incident. The gangrenous area of cæcum and mesentery was necessarily left however within the abdomen. After closing the abdomen, I advised my assistants that in my opinion he would die just the same, which he did on the eighth day after operation—not from a general peritonitis proper, but from a localized gangrene that spread up the cæcum and the mesentery. He had indeed written his own death warrant with the catharsis and enemas. He had acute obstruction of the bowel, but of the appendical portion of the bowel, and had one of the angriest looking and most acutely gangrenous appendices I have ever seen.

The profession generally does not seem to realize that acute appendicitis at the outset is nothing more or less than acute intestinal obstruction and should be so dealt with. If we could look into the abdomen and see the acute obstruction of the small bowel as soon as it occurs, no doctor would give cathartics nor enemas but would immediately send for a surgeon. The appendix is a small appendage of the bowel, has a free opening into the cæcum, and a patent lumen blind at one end. A fæcolith, foreign body, or an occasional metastatic inflammatory area of the wall obstructs the lumen at one point and causes pain. Is this not a true intestinal obstruction, and in a portion of intestine that is shut off distally? Why not diagnose it as acute intestinal obstruction at once, and so treat it?

What are the symptoms of acute intestinal obstruction when it involves the appendical portion? Pain, first, last, and always, acute pain of varying intensity at first, usually in the right lower quadrant of the abdomen; but remember, it may be anywhere in the abdomen, even above the navel and entirely on the left side, as in the case of my unfortunate friend. The symptom on which to make the diagnosis is pain. There may perhaps be a little nausea at first, rarely vomiting; that comes later. The abdomen is not rigid nor fixed. There is no deep tenderness on palpation nor per rectum, unless the appendix lies in the pelvis and can

actually be touched with the examining finger in the rectum. There is no elevation of temperature or pulse rate. These are all signs of inflammation and present themselves later, too late. They should not be found by a doctor, except when he has been called in too late by the patient. The patient should be operated upon before the symptoms that develop with inflammation present themselves. Do not wait and see.

Under no consideration whatever give a cathartic nor an enema. A rectal suppository may safely be employed if the rectum is full of fæces, but nothing else whatsoever should be done to move the bowels. Many years ago it was pointed out that an acutely inflamed appendix probably never ruptures if a cathartic or an enema is not given.

Let us bear in mind that acute appendicitis and acute perforated peptic ulcer still kill more people in this country before forty-five years of age than does tuberculosis. The tragedy is that such deaths are avoidable. Education of the profession and the public should largely do away with such unfortunate and untimely deaths. Deaths from acute appendicitis are on the increase. Some of the factors contributing to this regrettable increased mortality are these:

More people are being operated upon for appendicitis. Too many inexperienced and improperly trained practitioners are undertaking surgery. It is a common expression to hear a doctor, whose surgical training must have been somewhat limited, to say the least, state that he always does his own appendices and hernias. John B. Murphy's dictum "that the operation for appendicitis can be the easiest and most difficult in the entire field of abdominal surgery" should be borne in mind. The younger generation of practitioners, as C. H. Mayo has pointed out, has not been impressed with the seriousness of such a condition, and the necessity for immediate diagnosis and operation in the early cases. Preliminary catharsis; delay in operating in the early cases; too precipitate operations in the late cases with spreading peritonitis; and failure to remove the appendix in the quiescent stage after an attack before another attack develops, directly accounts for the shameful mortality.

Hoffman,[1] the renowned statistician of the Prudential Insurance Company of America, pointed out in 1927 that in a study of sixty American cities the death rate from appendicitis per 100,000 had increased from 13.3 per cent in 1910 to 17.6 per cent in 1925. For the year 1924 the mortality in the cities on this continent was 17.3 per cent, as against a mortality in Paris of 6.75 per cent, and in England and Wales, of 7.1 per cent. He points out that this avoidable mortality is due to failure on the part of the medical and surgical profession to deal properly with the disease.

Dr. John O. Bower,[2] of Philadelphia, in speaking recently of the two main causes of mortality before the patients enter hospital, *viz.*, delayed operation, and laxatives given before operation, pointed out that:—

> Of 750 patients operated upon in one hospital, the average time between the onset of the attack and operation, of those who survived was 69 hours; for those who died 150. At another hospital, of 252 cases the average interval for those who lived was 90.4 hours, and 157.7 hours for those who died. Of the 1,000 cases, 45.5 per cent had perforated. Of the 455 cases that had perforated, 89.7 per cent had been given laxatives. Of the 1,000 cases there were 87 deaths, and 70 per cent of these had general peritonitis; (*93 per cent, or 65 of these, had been given laxatives before being sent to hospital*). The mortality for general peritonitis still varies from 13 to 45 per cent, depending on the surgeon, and on the stage of the disease.

CONCLUSIONS

Certain problems confront the profession in their effort to reduce an appalling mortality that is a direct affront to the great advances of medicine and surgery.

1. Education of the profession and the public as to the seriousness of this disease, the necessity for early diagnosis, and immediate operation in the early case.

2. The grave menace of laxatives and enemas employed prior to operation.

3. More experience in the management of spreading peritonitis, which will largely disappear if laxatives are avoided.

The profession should learn to visualize acute appendicitis as acute obstruction of the bowel without any great inflammatory changes at that stage, and treat it as such surgically before the inflammatory processes develop. Professor Wilkie's classical contribution[3] to this subject should be read by every member of the profession.

It should be the duty of every doctor, every nurse, all health associations, through the

schools, churches, women's organizations, through the press, and in every possible way to constantly instruct people that if they develop a pain in the abdomen, they should immediately go to bed, put an ice-cap over the site of the pain, take nothing whatever by mouth, and send for their doctor. *Under no conditions whatever should they take a cathartic or an enema.*

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SHOULDER PAIN—A CONSIDERATION OF SOME EASILY OVERLOOKED CAUSES*

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ONE of the most common complaints met with in any orthopædic department is shoulder pain, and as a multitude of conditions may be responsible, a consideration of these is most profitable to anyone called upon to diagnose and treat such cases. In the differential diagnosis of pathological conditions of the shoulder-joint one must consider trauma, arthritis, tuberculosis, acute pyogenic infection, loose bodies, neuro-arthropathy, tumours, reflex pain, etc. We shall deal however only with some of the less frequently suspected causes of such pain.

ETIOLOGY

Shoulder pains due to biliary colic and diaphragmatic pleurisy are occasionally encountered. These belong to the group of reflex disturbances, the reason for which is evident from a consideration of the development of the structures concerned. The phrenic nerves arise mainly from the fourth cervical segment, with small branches from both the third and fifth cervical segments. Motor and sensory branches pass down through the thorax to supply the diaphragm. The diaphragm is formed in the neck, and early in intra-uterine life, about the same time that the lung buds are developing from the foregut, it descends to its new position from the neck, carrying with it the phrenic nerves. From the same spinal segments of the embryo come the descending branches of the third and fourth cervical nerves to supply the skin in the neighbourhood of the acromion, supraclavicular and suprascapular areas. We see, therefore, that because the cutaneous nerves to the skin of the shoulder arise from the same spinal segment as the nerves to the diaphragm, a condition which causes irritation of the latter, its serous coverings or the contiguous tissue supplied by the phrenic nerve, may also be the cause of shoulder pain. Consequently, the possibility of this condition being caused by diseases of the liver, stomach, duodenum, pancreas and spleen below the diaphragm, and the pleura and pericardium above, must ever be in the mind of the clinician. Effusions into the peritoneal cavity, such as hæmorrhage and collections of pus under the diaphragm as in subphrenic abscess may also be responsible. It seems a far call from the ruptured ectopic gestation to shoulder pain, nevertheless it is reported as having been caused by the irritation of a collection of intraperitoneal blood pressing up under the diaphragm.

One troublesome condition that we frequently find has been spoken of as "irritable arm" or "false neuritis." Frequently in women presenting a marked nervous syndrome, slight injuries or overuse of the joint, particularly where shoulder muscles are poorly developed, may be followed by marked symptoms. Atrophy of the shoulder muscles is seen and great pain arises involving the whole arm. The diagnosis of neuritis is commonly made and the patient is perfectly satisfied with it. Actually the signs of neuritis are not present; sensation is not disturbed; there is no tenderness along the nerve trunks, nor is there any swelling of the hand. After use the arm aches and feels heavy, even a game of bridge being sufficient to bring on the discomfort. Heavy clothing, by pressure on the

* A paper read before the Lockwood Clinic staff meeting on February 20, 1929.

shoulders, and the carrying of moderately heavy articles will aggravate the symptoms. Because of the pain caused by movement the arm is frequently carried at the side in a sling, and adaptive shortening takes place in the pectoralis major, creating a vicious circle which adds to the limitation and pain on abduction. Owing to the maintenance of this adducted position, sometimes over periods of months, adhesions form. These have to be broken down by manipulation, and after the acute symptoms subside, exercises for the development of the shoulder muscles are commenced. In the milder cases effleurage and the application of radiant heat do much to improve the circulation and muscular tone. This should be followed by a series of exercises to develop the shoulder muscles.

ANATOMICAL CONSIDERATIONS

That shoulder injuries are common is due to the anatomical construction of the joint. To allow for the wide range of movement which exists, the glenoid cavity is very shallow and occupies a vertical direction. The capsule and ligaments are lax and the muscles which form such an important part of the defence mechanism are closely associated with the bursæ, ligaments and capsule. When the muscular attachments are severed, the head of the humerus drops away from the glenoid in a striking manner. The scapulo-humeral muscles, deltoid, biceps, subscapularis, supraspinatus, infraspinatus, teres minor, etc., play an important part in holding the head of the humerus in the glenoid cavity. The relationship of the muscles surrounding the joint is important. Some of these are in intimate contact. The subscapularis is closely merged with the front of the capsule, and between it and the capsule is to be found a bursa which communicates with the joint. The long head of the biceps is intrascapular, being enclosed in a diverticulum of synovial membrane for a distance of five centimetres after it emerges from the capsule and while it lies in the intertubercular sulcus. The supraspinatus tendon passes over the surface of the capsule, and is adherent to it at or near its insertion to the greater tuberosity. The infraspinatus tendon crosses behind the capsule and braces it. The deltoid, while occupying a more superficial plane, is in close relationship to the subdeltoid bursa, which separates it from the supraspinatus tendon. From this consideration it is easy to understand why injuries to any of these muscles or their tendons may become a cause of traumatic inflammatory changes and hæmorrhage, with subsequent fibrosis and adhesions, followed by pain, disability and limitation of motion. The free motion lax ligaments, and the intimate relationship between capsule, ligaments, muscles, and bursæ, explain the predisposition of this joint to injury and the difficulty in attributing the disability to the injury of any one isolated structure.

Owing to the fact that the muscles play such a large part in the support of the weight of the arms and control of range of arm movements, injury of the capsule *per se* is not so frequent as in other joints. But the capsule, the ligaments, the synovial membrane, and the cartilage do suffer injuries, although frequently combined with muscle strain, hæmorrhage and effusion into surrounding structures, and the term "sprain" is applied, the last state of which is frequently designated "periarthritis."

Muscle balance has to be considered in all shoulder injuries. Adduction of the humerus is accomplished by two large powerful muscles, the pectoralis major and the latissimus dorsi. The opposite movement is effected by the action of the deltoid and the supraspinatus muscles. As the first action of the deltoid is to lift the arm in a vertical direction until the head of the humerus impinges on the glenoid cavity, the supraspinatus, which initiates abduction, tends to be overbalanced by the larger and more powerful adductors in any condition in which abduction of the arm is attended by pain and protective muscle spasm.

MUSCULAR STRAIN

Strain of the muscles is not uncommon. The deltoid, the biceps, the muscles of external and internal rotation, the supraspinatus and the interscapular muscles may show this condition. In fact a large percentage of the disabilities met with in the neighbourhood of this joint can be attributed to muscle strain. It occurs usually as the result of sudden tension on the muscles. Pain on movement is complained of along the injured muscle, sometimes referred to the origin, sometimes to the insertion, and a localized tenderness may be detected on palpation. The pathological lesion consists of a stretching of muscle fibres and hæmorrhage into the muscle. Strain of the deltoid causes pain on abducting the arm from the side. If the biceps is affected, passive resistance to supination of the forearm and flexion of the elbow causes pain. Tenderness

on pressure in the intertubercular sulcus is frequently met with when the long head is injured. The pectoralis major and subscapularis rotate the head of the humerus inward, and when pain is present on internal rotation, one of these muscles may be injured. If the pectoralis major muscle is not tender on palpation, involvement of the anterior part of the capsule or the subscapularis tendon is suspected. Pain on external rotation is found on injury to the infraspinatus and teres minor muscles.

A muscular condition which is often overlooked is strain of the rhomboideus minor muscle. It is worth special description. It is frequently seen in those who do work of the nature of pitching hay, firing a furnace, or swinging a sledge hammer. The symptom-complex is well defined. The workman is seized with sudden stabbing pain just mesial to the base of the spine of the scapula. He feels as if something had given way. The pain lasts for about twenty minutes; then it eases off and he is able to continue his work, though suffering from aching between the shoulder blades. Pain is experienced in the interscapular region when the arm is used in abduction. On physical examination a tender area, distinctly localized and about the size of half a dollar, is found just mesial to the base of the spine of the scapula. On putting the arm through its range of abduction, no pain is experienced until the ninety degree point is reached, but as the movement is continued beyond that aching at the point of tenderness becomes increasingly severe. The mechanism of the production of this lesion is interesting. Abduction to a right angle is effected by the action of the supraspinatus and deltoid muscles. Beyond this point the movement is continued by the combined fulcrum action of the serratus anterior and trapezius. To offset the strong muscular force exerted by such large muscles as the serratus and trapezius we have the much weaker interscapular group, viz., the rhomboideus major and minor, and the levator anguli scapulæ, plus gravity. It is at the top of the swing of the sledge hammer that the muscle suffers injury and the rhomboideus minor is picked out because of the narrowness of its insertion, its oblique direction, and the fact that it is a small band-like muscle. The condition responds favourably to fixation of the scapula with adhesive tape after it has been drawn back as far as possible toward the middle line. This keeps the tension off the muscle and can be supplemented in severe cases by the use of a sling to support the elbow.

RUPTURE OF THE SUPRASPINATUS TENDON

Rupture of the supraspinatus tendon commonly takes place at its insertion into the greater tuberosity. A fragment of bone may or may not be torn off with the tendon. If there is an avulsion fracture of the greater tuberosity the arm should be put up in abduction and external rotation. If the apposition of the fragments is not satisfactory for union on x-ray examination, operative fixation of the displaced fragment to the head of the humerus should be undertaken.

The occurrence of so-called areas of "calcification" in the tendon of the supraspinatus is an interesting condition. In many cases there is no history of injury. The roentgenogram shows an area of opacity occupying the course of the tendon and varying in size from 0.5 to 2.5 cm. in length. These deposits were thought to consist of calcium, but Stern[1] published three cases, in all of which an area of supposed calcification was seen in this region; at subsequent operation, followed by microscopic examination and chemical tests, the removed deposits proved to be amorphous fat. For long it has been known that shadows in this area may disappear, particularly when diathermy has been given. This behaviour is to be expected from fat more than from calcium deposits.

SUB-DELTOID BURSITIS

So much criticism has been levelled at the diagnosis of sub-deltoid bursitis that it is perhaps worth while reaffirming that the condition actually exists. While it is true that, with improved technique in radiology and more careful investigation of cases, conditions causing symptoms similar to that of bursitis have been established as definite clinical entities, it cannot be denied that the sub-deltoid bursa, owing to its close association with the capsule on one hand and the supraspinatus tendon on the other, is frequently the site of irritation and traumatic inflammation causing pain on abduction of the arm. Deposits have been removed from the walls of the bursa, though Codman[2] pointed out that on exploration the bursa was frequently found to be empty and it was necessary to incise the posterior wall and come down on the underlying supraspinatus tendon before reaching them. When it is inflamed, swelling can sometimes be detected in the bursa, and tenderness is found

over the greater tuberosity just external to the intertubercular sulcus. There is such a close relationship between the muscles, ligaments, and capsule of the joint that with inflammation of the bursa there is usually involvement of adjacent structures. When the arm has been abducted to a right angle, tenderness in affections of the bursa can no longer be elicited, as it has passed under the overhanging acromion; but at a point of forty-five degrees of abduction, pain becomes very acute as there is compression of the bursa between the head of the humerus and the under surface of the acromion. To avoid this, the patient flexes the arm forward when attempting to raise it from the side.

In the treatment of this condition in the acute stage, the arm is abducted from the side, either by a splint or by the use of an axillary pad. Frequently, abduction may be obtained by tying the wrist to the top of the bed, giving ample support to the back and arm by pillows, and by raising the head of the bed, so that while the arm is stationary the body tends to gravitate away from it. After the acute stage has subsided, light massage, diathermy or other forms of heat and passive movements should be used. Following this, resistive exercises for the improvement of the shoulder muscles should be instituted. Manipulation under anæsthesia should be resorted to in cases of adhesions following long standing adduction of the arm to the side, and where passive motion is restricted. More recently in cases of sub-deltoid bursitis x-ray dosage has been employed by some with reported success.[3] Where there is marked swelling of the bursa, this sac may be aspirated. In cases of chronic bursitis the bursa may be dissected out by means of a vertical incision through the deltoid.

SYNOVITIS

Synovitis of the shoulder-joint when present in a mild degree is not easily detected, but examination from the axilla is helpful. The pathological changes here differ in no way from those in other joints. If synovitis exists the capsule is distended evenly; swelling may sometimes be felt between the deltoid and pectoralis major, and effusion takes place into the diverticulum which surrounds the tendon of the long head of biceps. The joint may be aspirated at a point just external to the coracoid process where the capsule is most superficial and easily accessible.

INTRA-ARTICULAR ADHESIONS

Adhesions within a joint commonly follow persistent disability lasting for prolonged periods. In the case of the shoulder-joint these are the more prone to form because the lax capsule folds easily on itself. This is especially likely to occur if the shoulder is left too long at rest in the adducted position following acute lesion or sprain. Limitation of abduction and rotation becomes marked, necessitating manipulation under anæsthesia. Indeed one of the most prolific causes of disability is the maintenance of the adducted position, and many of the dramatic cures of the non-professional practitioner may be ascribed to the harmful results of this. The bone-setters' judgments may be indiscriminate, but their results should encourage us to bear in mind the value of manipulation in selected cases where the arm has been allowed to remain at the side with resultant adhesions.

The result of such manipulation depends first on the existing condition and secondly on the technique. In mild cases of peri-articular or intra-articular adhesions, one manipulation under general anæsthesia is sufficient to yield full movement in all directions, but where adhesions are general, it is at the same time necessary and safe to multiply the number of manipulations, being content with small gains at each session and not risking the addition of a fracture to the existing disability.

In the performance of the manipulation, ether anæsthesia gives full relaxation of the muscles and is preferable to gas in severe cases. When anæsthesia has been induced and the muscles are relaxed, in the milder cases the arm should be grasped below the elbow, and in the more severe cases above the elbow, with the corresponding hand, the other being used to fix the scapula. By putting his arms round the chest from the opposite side of the patient, an assistant may get good fixation of the scapula to the chest wall by pressure over the axillary border and inferior angle. The surgeon first loosens the joint by preliminary rotatory movements performed in abduction, adduction, flexion, and extension, within the range of movement possible; then abduction is carried out with an assistant's fist pressed up into the axilla to check any tendency on the part of the head of the bone to pass down through the weakened inferior capsule of the joint, the scapula meanwhile being firmly fixed. When full abduction is reached, rotatory movements

are again performed. With the scapula free to rotate, the movement is continued through the normal range outwards, then flexed and elevated forwards and extended backwards. The combined movement of circumduction completes the manipulation. The arm is kept in abduction and external rotation by tying the wrist to the top of the bed. This position is maintained for twenty-four hours and the pain may be severe enough to require opiates. Movements through the full range obtained and re-education of muscles are then commenced, heat and massage being used as auxiliary measures. In cases where several manipulations are required, the arm should be kept in the position of fullest obtainable abduction during the intervals between treatments. It has been our experience that these minor painful conditions, though resistant, usually yield to carefully and persistently followed treatment.

It should be recognized that in the diagnosis and treatment of shoulder injuries there is usually more than one factor involved. The shoulder should be treated as a whole with the resultant function as the primary consideration. In cases where limitation of motion is feared, resort should be had to the abducted position as early as possible, and without hesitation.

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POST-OPERATIVE NAUSEA*

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NO sequel of surgery looms so large in the mind of the patient as the distress occasioned by nausea and vomiting in those first hours or days following a major operation. My remarks are founded on a careful study of 450 cases, mostly laparotomies, and constitute a series of very brief comments provoked by specific experiences rather than an essay on the subject.

Scientific medicine is concentrating its forces more and more on the *prevention* of disease. Within the memory of every man here to-day typhoid fever, diphtheria, eclampsia and even "rheumatism" were accepted as part and parcel of the "scheme of things" and their treatment occupied a very substantial portion of the time and thought of every physician. To-day the treatment of these diseases receives scant attention compared to the care given to avoid their occurrence. And just so long as nausea and vomiting are regarded as the just and normal price which those who invoke the great blessings of anæsthesia and the surgeon's knife must pay in compensation, so long will we fail to avoid an evil, by no means always inevitable.

As with most other ills, treatment of the developed condition is never more than partly successful, and in this altogether wretched sequel to a large part of our surgical work, I believe there is to-day great room for improvement. The abundant success of the surgeon in his ultimate results has, too often, I fear, led him to regard lightly what to the experienced patient is an item so important as to constitute a real nightmare whenever "operation" is mentioned. Yet, just as the pangs of labour may be so mollified that the mother will immediately speak without dread of "next time", so may these distressing sequels of surgery and anæsthesia be reduced very nearly to the vanishing point. Treatment, however, must begin " before the fact". It must be founded on a thorough understanding of the contributing causes and scrupulous care in applying rational preventive measures.

What then are the causes of post-operative vomiting? I think we may group them mainly under three headings: (1) the anæsthetic; (2) the operation; (3) the subjective nervous reactions of the patient.

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

THE ANÆSTHETIC

The effective administration of anæsthetics is a highly technical art not to be learned easily or quickly. Neither the general public nor the medical profession accord the skilled anæsthetist either the respect or the fee he deserves. Because a degree in medicine entitles a man, under the law, to put a patient to sleep with ether is no more reason why he should be allowed to do it without special training than that we should approve of his operating on an exophthalmic goitre or doing a gastroenterostomy before even serving an interneship. One of the absolute necessities in the avoidance of post-operative nausea is an expert anæsthetist, for it is much more the manner of administration than the fact of administration, which determines the after-effects. People react more variously to ether, chloroform or nitrous oxide than they do to alcohol, and are infinitely more at the mercy of the administrator.

The non-toxic anæsthetic is a hope of the future. And not only must we recognize the toxic effect of the drug itself, but the fact that by reducing the combining power of oxygen with the hæmoglobin—especially true in the case of chloroform—we are liable, unless oxygen is added to the inspired air, to add another even more disturbing toxic factor.

And third, and most important, I believe, of the effects of anæsthetics, especially ether, in producing nausea, is the tendency to collection of mucus in the air passages, occasionally inducing pneumonia, always tending to vomiting as a means of clearing the bronchi, as is commonly seen in whooping-cough. Viscous, ether-saturated mucus in the bronchial tubes, or adhering to the walls of an empty stomach, will doubtless require many vigorous spasms of vomiting to dislodge. It is as much the business of the anæsthetist to remove the mucus from the trachea as of the surgeon to remove the sponges from the abdominal cavity before calling the operation complete.

THE OPERATION

The technique of the surgeon in the operating room has much to do with the suffering complained of next day in the ward. Every unnecessary insult to the tissue of the unconscious patient is recorded in the nervous system and will give reactions, sometimes seemingly quite remote in time and place from the site of the operation. Injury to the labyrinth in a mastoid case, phrenic irritation in the removal of enlarged cervical glands, and any injury near the diaphragm, as in operations on the kidney, may induce vomiting in no way due to the anæsthetic.

In laparotomies the rough, even destructive, treatment all too frequently accorded to the peritoneum is bound to produce ileus, with its resultant toxæmia, nausea and vomiting, for which the surgeon is entirely responsible. If a punch below the belt can produce nausea to a degree of vomiting, what about the effect of crushing clamps locked on the gut, vigorous pulling on the mesentery and blanching hot sponges applied to the peritoneum? Those who treat these delicate and sensitive tissues with lack of care, simply because their guardian is temporarily asleep, should study well the alleviation of post-operative ileus and nausea, for they are bound to have plenty of both to treat.

THE NERVOUS REACTION OF THE PATIENT

Sensitiveness to external or internal stimuli varies with each individual. Pain, as of suturing the skin, which is quite tolerable to one, is agony to another. The rolling sea and staggering ship produce only exhilarating joy in one but deathly nausea in his companion. Uncertainty and fear enormously multiply any suffering. And so patients react in widely differing degree to the disturbance of operations. The type of woman who will develop the so-called "pernicious vomiting" of pregnancy will tend to exhibit the same degree of vomiting post-operatively unless her treatment is begun by the surgeon *before she goes to the hospital.* Suggestive therapeutics is deserving of at least as large a place in surgical practise as in any department of medicine.

DIAGNOSIS

The diagnosis of the causes of post-operative nausea may be arrived at by considering: (1) the length of time since the operation; (2) the nature of the operation; (3) the character and type of the vomiting; and (4), the associated symptoms.

The length of time since operation.—Vomiting due to nitrous oxide is immediate and of

short duration, little more than that which may follow fainting. That due to ether is most marked in the first twelve hours and should decrease in the second twelve. Nausea due to chloroform is shorter lived, unless the anæsthetist has failed to supply extra oxygen, when the nausea may be delayed twenty-four or more hours and is then apt to persist some days, on account of blood destruction. Vigilance must be exercised in such cases that deficient excretion is not overlooked as a contributing or the main cause. Vomiting, at first due to the anæsthetic, is apt to be prolonged in the nervously susceptible individual and must be differentiated before starvation becomes the main factor and a vicious circle is established.

After faulty technique in a gastro-enterostomy, vomiting persisting over twenty-four hours might suggest a vicious circle; after three or four days, a possible peritonitis by extension through the suture line; and later still, the possibility of adhesion of the anterior and posterior edges of the wound. In this latter case there would not be the abundant bile of a vicious circle.

Vomiting appearing later than ordinary post-anæsthetic vomiting might be due to ileus, peritonitis, renal insufficiency or acute dilatation of the stomach. Nausea persisting some days may be due to a starvation acidosis.

In a case of breast amputation within the last year where we had been kept in ignorance of a two months' pregnancy, in hopes that operation might interrupt it, and which had been forgotten by the patient for the first two days, violent post-operative vomiting set in on the third day and remained so severe that the patient asked for curettage. Assurance that spontaneous abortion was bound to occur (which later proved to be a mistake) abruptly checked the vomiting.

The operation. — The site and degree of tissue injury may explain the nausea.

The character of the vomiting.—The vomitus in connection with anæsthesia consists of mucus with a small amount of bile which is raised with great difficulty. With acute dilatation of the stomach, large quantities of dark brown sour liquid is expelled repeatedly, apparently without effort, though no fluid is swallowed. Vomiting due to obstruction quickly becomes fæcal, and so on.

Associated symptoms.—Ileus gives distended abdomen, toxæmia, pain, etc.; peritonitis shows rigidity, tenderness and fever; acidosis gives clear indication through the breath and urine; nephritis, the typical kidney symptoms. Acute dilatation gives the extreme prostration, blue lips, clammy extremities, laboured breathing and small rapid pulse, and the diagnosis is clinched with the passage of the stomach tube.

TREATMENT

The surgeon who lacks the absolute confidence of his patient is only less fortunate than the patient himself, for neither will be happy with the outcome of the venture. No single element has more influence on the course of convalescence from a well-done operation than the confidence inspired by the surgeon, and the surgeon who can "cast out all fear" will have gone far in the control of post-operative pain and nausea.

Two men are going to contribute to the sorrows of the awaking patient—the operator and the anæsthetist, and between them there should be harmonious co-operation in the preparation of the patient, just as there should be consultations in the severe post-operative nauseas.

The custom of bringing patients into the hospital late in the evening to be operated upon early next morning is mentioned only to be condemned. Rest in bed with light diet—chiefly carbohydrate—and gentle evacuation of the bowels the day before operation are of undoubted advantage. We may anticipate the starvation of the following day by feeding, say, ten to twenty lumps of sugar with a quart of imperial drink, or better still, orange juice sweetened with glucose, during the evening. Well before bedtime the patient should have an enema, and strict orders should be left that he is not to be disturbed on any account during the night. In a strange bed with a certain degree of anxiety we should try to ensure sleep, and personally we have had satisfactory results for many years from chloretone, gr. XII-XV at 9.00 p.m., with or without a little light nourishment, as the patient desires. On awaking the patient may have a clear hot drink, if it is two hours or more before beginning the

anæsthetic. About an hour previous it is wise to give a sedative. Morphine is commonly used, but I have had, I believe, much better results with chloretone (gr. XV to XXX) which acts as a local anæsthetic in the stomach, a good hypnotic with not the slightest depressing effect on any patient, and lasts much longer than morphia. And here I believe sodium amytal may find a most useful place as a preliminary hypnotic, eliminating the disagreeable features of the ordinary induction of anæsthesia with its frequent excitement of the vomiting reflex. The emergency case in acute pain undoubtedly needs morphia.

Just before going to the operating room the patient may have a drachm of bicarbonate of soda, followed by a large glass of water, part of which will be absorbed and part remain to dilute any ether-saturated mucus which may be swallowed, and later probably vomited after the anæsthetic is withdrawn and before consciousness has returned. A hypodermic of atropine, gr. 1/150 to 1/100, at the same time will greatly help in controlling excessive mucus discharge in the throat and air passages.

A personal introduction to the anæsthetist—"the best anæsthetist in the city"—is worth the moment it takes.

The patient should be made as comfortable as possible on the operating table and kept thoroughly warm. The surgeon should be scrupulously careful to handle all tissues and organs as gently as though the patient were fully conscious and able to protest against any violence. Rasping the delicate peritoneum with rough gauze or partially cooking it with overhot sponge, the clamping of forceps on tissue which is not being removed, or other injury to abdominal organs is sure to mean trouble later on.

As soon as convenient after anæsthesia is complete it is well to start interstitial or intravenous instillation of saline (or glucose, if indicated) and, in laparotomies, 1,000 to 2,000 c.c. of normal saline left in the abdominal cavity further insure the avoidance of thirst and a free kidney action. But it is the anæsthetist who is frequently the greatest sinner at this stage. Not only must he regulate the anæsthetic to the least amount necessary to produce sleep and the required degree of relaxation, but he must see that the lungs do not become flooded with mucus, which, in my opinion, is the most common cause of so-called ether vomiting. The administration of warm ether vapour with oxygen or other anæsthetic rightly given, and the skilful use of suction will avoid this most potent and common cause of postoperative distress.

Every effort should be made to keep the patient as quiet and as comfortable as possible. We have all noticed many times how the disturbance of even a brief visit of the surgeon has precipitated a spasm of vomiting in the already nauseated patient. Even the ordinary bed care should be reduced to the minimum.

A liberal use of morphine during the first twenty-four to thirty-six hours, or until the nausea has ceased, is most important. And by "liberal" I mean sufficient to maintain a state of semi-narcosis. Thus is the patient not only enabled to sleep off the effects of his anæsthetic but, by virtue of the narcotic effect on the bowel, spasm is relieved, gas is allowed to move along and distension is avoided. Indeed, for the first two or three days, it is well to instruct the nurse, that if she thinks the patient needs an enema, to give instead another hypodermic injection of morphia. Usually an enema during the first day or two after operation spells nothing but grief.

As soon as consciousness returns the patient's position should be changed at frequent intervals, unless one fears to spread a localized peritonitis, when the Fowler position should be maintained.

If proper care has been exercised there will be no complaint of thirst, but in any case the patient will avoid much nausea by abstaining from swallowing anything for the first twelve to twenty-four hours. When food is permissible, light solids, such as toast, arrowroot biscuits, etc., are much more encouraging to gastric peristalsis than slops. After twenty-four hours a little light nourishment will do much to avoid later nausea; but if, at the end of forty-eight hours, the patient is not taking a fair amount, then glucose intravenously is indicated. In the case lacking pre-operative care, saline, alkaline or glucose, as indicated, may be given per rectum as soon as the patient is back in bed. The Harris drip is, I believe, the most satisfactory method in these cases. In neglected cases I have more than

once seen a very persistent type of post-operative vomiting abruptly cease with the administration of 1,000 c.c. of 5 per cent glucose.

Should nausea, either with or without vomiting, persist over twelve hours a drachm of bicarbonate of soda in a glass of warm water will often wash out the stomach and give relief; or hypertonic salt solution (a drachm of sodium chloride in six ounces of cold water) is likely to set up normal peristalsis and is well worth a trial.

Acute dilatation of the stomach, if recognized early, will yield to gastric lavage, keeping the patient mostly on the left side or stomach with the foot of the bed raised.

In those cases taking little or no nourishment, with acetone and diacetic acid appearing in the urine, give 500 c.c. of 10 per cent glucose intravenously and 10 units of insulin hypodermically; but these latter conditions are better avoided than treated.

All of which might very well be reduced to say—The avoidance of post-operative nausea and vomiting demands: proper pre-operative care; expert administration of the anæsthetic; a skilled operator, kindly disposed to the temporarily narcotized tissues; and sedative, rather than provocative, post-operative treatment.

HAND INJURIES AND THEIR COMPENSATION

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THE reason for and the aim of compensation laws as they apply to injured workmen is to recompense them for any injury they may have sustained and the loss of earning power thereby entailed. This basic principle—a just and very humanitarian one—is now universally admitted.

In order that this principle should be unmistakably recognized and accepted in practice—the International Association of Industrial Accidents Boards and Commissions at its meeting in 1923 unanimously laid down the following rules:—

A. Compensation for permanent partial disability shall be valued as percentage of permanent total disability.

B. The permanent disability schedule shall be one designed to measure the *loss of earning capacity.*

C. It shall be based on "variable factors", to be taken into account, which shall be:—

1. The nature of the injury.
2. The age of the injured employee.
3. When the permanent disability is of a character which peculiarly and exceptionally unfits the employee for the performance of the occupation in which he is experienced the benefits shall be increased to compensate for the excessive handicap to such a degree as may be determined by the Commission, but not more than 25 per cent of the schedule allowances. (Report, 1923, p. 16.)

As an illustration, the Committee's report points to the fact that "the loss of a leg will be a severer handicap to a structural steel worker or railroad brakeman than to a machinist." Farther on the report emphasizes the point that "in general it may be said that workmen's compensation schedules are based primarily on loss of earning capacity." It concludes (p. 20) "upon this basis the greatest substantial justice will be obtained." The report also insists on the relative importance of taking into account the age of the insured: "for not only will it be more difficult for the older man to learn a new trade, but his very age will be an effective bar to employment; industry gives little encouragement to old men". Education, training, experience and mentality might also be taken into consideration, but the Committee waives these considerations aside. And in order that a just and equitable compensation be accorded the injured, the Committee recommends that "Compensation Commissions should have discretionary power to increase the schedule allowances in special cases." (p. 21).

Under the guidance of these generally accepted principles let us examine the basis

for compensation in injuries to the hand. What ought this basis to be? Is the evaluation for compensation to be arrived at on the basis of anatomical considerations as opposed to functional ones?

According to Jones Llewellyn and Bassett Jones, the estimation of the injury ought to be "a proportion corresponding to the degree of disablement," and this is as it should be, the intent being to indemnify the disabled man for the loss or depreciation of functional capacity, and, further, they state that "the irrational nature of anatomical evaluation is self-evident. The evaluation of function alone avails us." As concerns the injured limb it is not the antomical state thereof, but what is its functional worth? —what can the man do with it?—that ought to be the basis for compensation. Here, differential consideration must be given to the point whether the injury affects the right or left hand and whether the workman is right or left-handed. One must also bear in mind that the same injury is far from having the same consequences in all cases; it must be judged in relation to the worker's occupation. Is this opinion accepted everywhere? How do European experts in industrial medicine appraise hand incapacities?

In their study on "Multiple injuries," Imbert and Chavagnac say, in agreement with Remy, "The total sum incapacity is obtained by adding the partial incapacities, so long as the supplementary function is furnished by the opposite organ." But they immediately add, "On the other hand, compensation must be increased when supplementary function is not existent." Furthermore, they specifically say, "As for the loss of all five fingers of one hand it is considered equivalent to the total loss of the hand." They also point to the fact that the result of stiffness of the fingers is at times equivalent to the functional loss of the hand (p. 77).

Forgues and Jeanbreau state in very clear terms, "The disability is proportionate to the amount of function remaining."

The leading European experts, English as well as French, are agreed in holding that functional impairment and not anatomical loss only must serve as the basis in compensation in hand injuries—the "earning capacity residue," as Bassett Jones styles it. Let us illustrate by an example from our files.

(Case No. 593/29): R.P., a male, aged 14 years, met with an accident to both of his hands. The index and thumb were the only remaining digits on the left hand, with a useless stump of the proximal phalanx of the middle finger; the thumb and little finger alone remained on the right hand, with useless and painful stumps of the proximal phalanges of the index and ring fingers, and total loss of the middle finger.

Computed purely on the anatomical loss, according to the compensation allowed for finger losses by the Quebec Compensation Schedule, this young man would receive for the injuries to his right hand 14 per cent, and for those to his left hand 4, making a total of 18 per cent partial permanent incapacity. Now where is the competent and just appraiser who would think this compensation an adequate one? In the particular case stated is not the earning capacity of the left hand (thumb and index finger alone remaining) lost by 50 per cent whilst that of the right hand (thumb and little finger alone remaining) lost by 75 per cent.

Our Quebec law allows for the loss of the entire hand: left, 32 per cent; 32 per cent less 50 per cent equals 16 per cent; right, 42 per cent; 42 per cent less 75 per cent equals 31.5 per cent; making a total partial permanent incapacity of 49.5, say, 50 per cent. So, if we appraise a hand incapacity on the basis of antomical loss only, our law, vague in its expression, might permit us to allow in this case only an 18 per cent permanent incapacity. Is this equitable? Most certainly not. If we honestly base our estimation on the loss of earning capacity we have to raise the compensation to 50 per cent, —still scarcely equitable?

Why should the basis for our estimation be the loss of earning capacity?

1. Because, as aforesaid and unanimously laid down by the International Association of Industrial Accident Boards and Commissions in 1923, "the permanent disability shall be measured by the loss of earning power."

2. Because "upon this basis the greatest substantial justice will be obtained."

3. Because conscientious medical experts, the world over, are of one mind on this subject.

4. Because, again, we ought to follow in this instance what is done for other injuries to the hand.

For the sake of illustration. A man gets his hand crushed by machinery, or receives a finger injury with consequent deeply seated infection of the palmar fascia. No fingers are lost, but nevertheless he is justly compensated for the residual infirmity, estimated on the loss of earning power, and not on the anatomical loss. "Total loss of use of a member shall be the same as loss of member", says the New York State law (1927, p. 56).

If a man loses both hands he is adjudged totally incapacitated — incapacité absolue permanente, as so aptly phrased by the President of the Quebec Compensation Board in a recent paper. Then why not appraise hand injuries equitably on the basis of relative loss of capacity to work? Why use two different weights and measures?

Accordingly, in fairness and equity, as well as because of the humanitarian principle laid down by and unanimously accepted by the International Association of Industrial Accidents Boards and Commissions, and in the light of common sense as well, the basis of estimation of hand injuries ought to be based on the *loss of earning capacity* and not on the *anatomical loss* only.

To sum up. Any compensation law which does not recognize these principles is contrary to equity. It is imperative that it should be revised, and the sooner the better, so as to secure justice for the injured.

THE FLAVOURING OF EXPECTORANT MIXTURES

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EXPECTORANT mixtures have a definite but limited place in medicine. They are not curative, but undoubtedly alleviate the symptoms of patients in certain stages of bronchitis or tracheitis. Cough is a reflex, elicited particularly from the bifurcations of the respiratory tree and the true and false vocal chords. The ciliated lining of the tract can only function normally when the mucus bathing it is of normal viscosity. In the early stages of a bronchial infection the mucous membrane is inflamed, congested and dry. The cilia cannot function normally. The sensory endings are irritated by air currents and cough results. Later in the disease, when the bronchial secretion becomes mucopurulent and sticky, there is again marked cough and ciliary embarrassment. In either of these conditions a flow of mucus relieves the cough, "loosens the cough".

The true expectorant drugs probably all act reflexly. It may be noted that in larger doses they all produce reflex nausea. We may take it that their action consists in setting up reflexes from the stomach to the salivary and bronchial glands. (Henderson and Taylor).

The drugs used to produce this action have been legion. The pseudo-scientific pharmaceutical house delights in reviving dead members of the group such as cocillana and euphorbia. The expectorant drugs are still numerous, but to-day the pharmacopœial drugs of this class in common use are: ipecacuanha, antimony, ammonium carbonate and chloride, squills, senega.

The last-mentioned drug, senega, is very unpalatable and hard to cover. The ammonium chloride tends to affect the acid-base balance of the blood by splitting into ammonia and chlor-ions. The former is converted into urea and the chlor-ions are free to take up available base. There is also less proof of its efficiency than in the case of the carbonate. Hence we shall confine our attention to ipecacuanha, antimony and ammonium carbonate. Of these three substances the last is by far the most difficult to cover, but, from personal experience of members of this department, it has been found that ammonium carbonate is the most efficient of the three.

These substances will now be considered individually, and discussed from three angles: 1() taste; palatability without flavouring; (2) in regard to different flavours; (3) in regard to choice of flavours.

Vinum ipecacuanhæ.—It has been found from experience that one must use about twenty minims to obtain an expectorant effect with wine of ipecacuanha. A mixture of 20 minims of wine of ipecacuanha and water to one drachm produces a mixture that is sweet to the taste and quite palatable and pleasant. From this one would expect that wine of ipecacuanha can be easily administered in pleasant mixtures. This is the case. The addition to the above mixture of 15 minims of syrup of orange, lemon, tolu or ginger, makes a very agreeable mixture. The choice of which syrup to use will depend upon the patient's choice for ginger, orange, etc.

℞	Vini ipecacuanhæ	mm. xx
	Syrupi aurantii	mm. xv
	Aquæ ad	ʒ i

In the case of children to whom we do not wish to administer syrup, and diabetics, saccharin can be substituted. Doses of 1/12 gr. are adequate as a rule.

℞	Vini ipecacuanhæ	mm. xx
	Glucidi	gr. ½
	Aquæ ad	ʒ i

Vinum antimoniale.—The dose again is found from experience to be in the neighbourhood of 20 minims. The taste is sweet, quite rich, slightly less pleasant than ipecacunha, but not objectionable. Wine of antimony is adequately covered by any of the above mentioned syrups, namely, orange, lemon, tolu, ginger.

℞	Vini antimonialis	mm. xx
	Syrupi tolutani	mm. xv
	Aquæ ad	ʒ i

Ammonium carbonate has a very ammoniacal odour. The taste is very pungent and burning, very unpleasant. Its adequate dose has been found to be 5 grains, dissolved in a drachm of water. It was found that the only syrup able to cover it at all well was syrup of tolu.

℞	Ammonii carbonatis	gr. v
	Syrupi tolutani	mm. xv
	Aquæ ad	ʒ i

This mixture is fair, having only a slight ammoniacal taste. The other syrups produced very unpleasant mixtures.

It was necessary to employ other flavours in addition to the syrup to cover the ammonium carbonate well. The most satisfactory were fluid extract of liquorice, anise water and compound tincture of cardamoms. Thus, for those caring for liquorice as a flavour, the following is very good:—

℞	Ammonii carbonatis	gr. v
	Extracti glycyrrhizæ liquidi	mm. viii
	Syrupi tolutani	mm. xv
	Aquæ ad	ʒ i

People who do not care for liquorice will find the following prescription very good:—

℞	Ammonii carbonatis	gr. v
	Tinct. cardom. comp.	mm. x
	Syrupi tolutani	mm. xv
	Aquæ ad	ʒ i

The compound tincture of lavender was also tried. The various workers in this department found it unpleasant, hence it was discarded as a flavour for ammonium carbonate.

In children and diabetics the syrup can be replaced by 1/12 gr. saccharin, with no loss to palatability of the mixture used.

Expectorant mixtures should be used at frequent intervals in those stages of the disease where bronchial flow is scanty. Once the flow is established and abundant they can be withdrawn.

Combinations of two of these expectorants are frequently used, and are advisable:—

℞	Ammonii carbonatis	gr. iii
	Vini ipecacuanhæ	mm. x
	Syrupi tolutani	mm. xv
	Aquæ ad	ʒ i

Such combinations can be varied as frequently as the physician desires. The use of tincture of cardamoms will give a pinkish solution; liquorice will give a dark one.

Whereas, ipecacuanha and antimony belong to the old group of "depressant" expectorants, squill was usually included amongst the "stimulant" members of the group. These terms "depressant" and "stimulant" have nothing to do with their action on the production, reflexly, of bronchial mucus, but were intended to indicate their action on the heart and circulation.

As is well known, the glucosides of squill have a digitalis-like effect on cardiac muscle. However, the addition of acetic acid, as in syrup of squill, might be expected to have an hydrolytic effect on the glucoside, rendering it less potent. That this is the case has been proved by experiments, using the perfused frog's heart. The

hearts were perfused, according to Straub's method, with scillitoxin in a concentration of 1:500,000 of Ringer's solution. To half of such a solution was added enough acetic acid to give it the same concentration as the acetic acid in syrup of squill. This was allowed to stand for twenty-four hours and then it was brought back to the P_h of normal Ringer's solution. The experiments clearly showed that the addition of acetic acid had caused a very marked decrease in the potency of the scillitoxin. And there is no doubt that when squills is exposed to the stronger acetic acid of the acetate of squills, from which the syrup is made, no cardiac effect will be manifested. In our experience, save when used alone and in large doses, syrup of squills has little expectorant effect, and may be regarded as merely an agreeable flavour.

INTRAVENOUS PYELOGRAPHY

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AMONG the recent studies in the domain of urology those which have to do with intravenous pyelography take an important place. Authors, for the most part, find great advantages in this new method of renal exploration, and consider that it evidences a considerable advance in the surgery of the urinary passages. Intravenous pyelography always gives results and gives them quickly and well. The results obtained are excellent, in fact, quite as good as those from pyelography as ordinarily practised. These results, confirmed by clinical experience, show that the method possesses a rational value and seem to indicate a promising future.

It was in the United States, in 1926, twenty years after Lichtenberg and Völcker had thought of and practised pyelography, that Rowntree, Osborne, Sutherland and Scholl endeavoured to radiograph the kidneys and ureters while they were eliminating an opaque substance, previously injected into a vein, which was capable of demonstrating their position, size, and form. Other research workers, particularly in Germany, actively pursued the subject. Roseno, in 1928, published a study on intravenous pyelography. At the last Congress of the German Society of Urology he communicated the results which he had obtained with "pyelognost", a substance having an iodine and urea base. We should mention, also, the researches of Volkmann, Hryntschack,[1] Lichtenberg, and Rosenstein. Paroral pyelography was recommended by Koehler. Certain other investigators had some success, but met also difficulties and, in some cases, disaster. It is to Lichtenberg and Swick[2] to whom the credit belongs of having rendered pyelography of practical value through the use of "uroselectan," a substance with an iodine and urea base, but otherwise apparently of a somewhat indefinite composition. This organic combination of iodine would appear to be harmless. Circulatory, cardiac, hepatic, and renal disorders do not contraindicate this method of exploration. The authors report one death, but in a person who was already in a uræmic state.

Intravenous pyelography is noteworthy for the remarkable simplicity of its technique. Eighty to 100 c.c. of a 30 per cent solution of uroselectan are injected intravenously and a few minutes afterwards the radiographic work begins. Plates are taken ten, forty-five, and ninety minutes after the injection and will furnish complete information.

The pictures obtained on intravenous pyelography, often called "descending pyelography," demonstrate everything that can be shown by "ascending pyelography," that is to say, the method which consists in radiographing the kidneys and ureters after having injected them, by the help of the ureteral sound, with some substance opaque to x-rays (10 per cent collargol; 30 per cent sodium iodide). They show very clearly the position, forms, and volume of the calices, pelves, and ureters. This new method of examination permits equally well the

diagnosis of hydronephrosis, polycystic kidneys, malformations, ectopia, nephrolithiasis, and new growth. It fulfils all the indications that ascending pyelography can meet.

But the application of intravenous pyelography does not stop here. By means of radiograms taken at certain intervals it becomes possible, furthermore, to determine the duration and power of evacuation of the pelvis, to check up the motor activity and permeability of the ureter, and also to complete the diagnosis of certain affections of the bladder, such as diverticula, neoplasms, calculi, etc., that can be subjected to cystography. And a still more interesting thing, this new method of exploration enables one to judge of renal permeability, to compare the functional value of each kidney. To quote from Lichtenberg and Swick (*loc. cit.*): "The elimination of uroselectan makes possible the preparation of radiographic pictures which show the configuration of the pelvis, of the ureters, and the bladder very definitely. The method makes it also possible to estimate functional capacity, for the elimination of uroselectan is dependent on the secretory power of the kidneys. The intensity of the pictures is also dependent on the secretory capacity of the kidneys."

I had the opportunity, last March, of seeing a series of these radiographic pictures at the clinic of Professor Lichtenberg in the St. Hedwig Hospital, Berlin. They deserve all the praise that they have received, because of their clearness and the great amount of information that they give. The comparative results are particularly interesting and one may affirm that intravenous pyelography yields in no particular to pyelography done by aid of the ureteral sound, as is evidenced by tests of the two methods made on the same patient. Professor Lichtenberg also showed the value of his method in the investigation of the functional power of the kidneys. A kidney which has preserved a good power of concentration gives a sharp image, while the skiagram of a damaged kidney is more or less faint.

Another point of interest about intravenous pyelography is that it is always practicable, so to speak. Unfortunately, one cannot always say as much for ascending pyelography. Those who are accustomed to the latter method of examination know that it is not always possible to put ureteral sounds in position. Bladder incapacity and ureteral obstruction are the two principal causes of difficulty. Certain bladders, such as those with tuberculous lesions, are intolerant of any attempt to introduce a sound into the ureter. Jungano,[3] of Naples, has lately reported two cases of this kind, which indicate the value of intravenous pyelography. These two patients were suffering from a definite renal tuberculosis, but all the other methods of examination were unable to localize the side. In the first case, "the bladder, which empties itself completely, has a capacity of 15 c.c. and the vesical area is not defined, because the bladder readily bleeds." An intravenous injection of uroselectan was given, and "three radiograms, made ten, forty-five, and ninety minutes after the injection gave a convincing result, for, on the right side the medicament was very well eliminated, and one could see the pelvis and ureter perfectly; while on the left side there was not the least elimination, even ten minutes after the injection." Nephrectomy was performed and on section "the kidney was shown to be riddled with typical tuberculous cavities." In the second case "cystoscopy was performed twice under spinal anæsthesia, and nothing could be seen on account of the small capacity of the bladder (about 20 c.c.)" The injection of uroselectan gave a radiographic result "positive on the right side; the pelvis and the upper portion of the ureter could be seen very well. Nothing at all could be seen on the left side, in three examinations." Nephrectomy was done on the left side. "On section the kidney was found to be completely transformed into typical tuberculous cavities, of which one was large and full of pus."

Ascending pyelography becomes very difficult, in fact impracticable, in cases of kinking of the ureter which do not yield to changes of the position of the patient, in ureteral tumour, and in certain cases of lithiasis. It is unnecessary to lay stress upon those causes of obstruction which will permit the flow of a liquid from the kidney to the bladder but do not permit of the passage of the smallest sound.

If intravenous pyelography offers such advantages it is obvious that it ought to replace completely pyelography with ureteral sounds.

It is not to be denied, however, that the latter procedure has its value as an aid to diagnosis.

This general sketch will give some idea of the importance which intravenous pyelography is likely to obtain.

SUMMARY

We have here a new method of examination in urology which is interesting from several points of view.

With a simple technique, harmless and easy to carry out, intravenous pyelography with uroselectan gives the desired results; it gives even more than its name would indicate, since it provides at once a picture of the lesions and a functional test.

It has all the advantages of pyelography and pyeloscopy conducted by ascending ureteral injection.

Urological societies and congresses, which naturally practise the method, recognize its value and predict for it a brilliant future.

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Case Reports

RUPTURE OF THE AORTA

BY C. J. TIDMARSH, M.A., M.D.,

Montreal

Miss A. C., a children's nurse, aged 69, was admitted to the Royal Victoria Hospital on January 28, 1930, with the following history.

Complaints.—Pain in the left chest; weakness.

Present illness. — The patient was in good health until January 23, 1930, when she went out of doors to take in some clothes and was seized with a sudden severe pain between the shoulders. She then felt weak, chilly, and vomited twice. A physician was called who found the pulse 90, the temperature normal, and the general examination essentially negative. On the following day the pain was less severe, the temperature normal, and the lower left chest posteriorly was dull, with distant breath sounds and scattered fine moist râles. The next day the patient was able to sit up, but complained of a constant ache referred to the left chest posteriorly. No particular change in the patient's condition was reported until the sixth day, when she felt a sudden severe boring pain through the left chest aggravated by respiration. Her physician recommended admission to hospital.

Personal history.—Appendectomy ten years ago. She had always enjoyed excellent health: menopause, uneventful. No recent change had occurred in weight. She denied venereal disease. Her family history was essentially negative.

Present condition.—Pulse 90; temperature 98°; respiration 24. A well-developed woman with fair nutrition, slight cyanosis of lips, and no evident distress. The pupils were equal and active; reflexes active. The right border of the heart was 2 cm. to right of sternum; the left border merged with lung dullness; the sounds were clear with a rough apical systolic murmur. Blood pressure was 130/60. The chest was symmetrical; lagging of the left side on inspiration was noticed; diminished tactile fremitus present over the lower two-thirds of the left chest, with a flat percussion note, suppressed breath sounds and scattered fine moist crepitations. The right chest was negative, except for a narrow area of impaired resonance along the mid-clavicular line. The other systems were negative. Urine and stools negative. Blood count: red blood cells, 3,860,000; white blood cells, 14,700; hæmoglobin, 70 per cent.

An x-ray (Fig. 1) examination of the chest was reported as follows:—

"Heart and trachea are displaced to the right. Aorta obscured by a shadow in that region the size and shape of a kidney with its upper limit at the left sterno-

clavicular junction. No pulsation was seen on fluoroscopic examination. Left diaphragm is almost obscured by homogeneous density extending upwards and fading into normal radiability at the level of the fifth space behind. Appearance here is that of a layer of fluid in the pleural cavity. Thickened pleura left apex. Right diaphragm is not obscured. There is a large irregular calcified pleural plaque in the right chest extending from the diaphragm upward to the fifth space and involving the middle and inner zones of the pleura. Laterally it is sharply limited by a vertical straight line showing normal lung markings from there to lateral wall of the chest.''

FIG. 1

A thoracentesis was performed and 2 c.c. of dark red blood aspirated. On the 10th day from onset a complete right-sided hemiplegia developed and death ensued on the 12th day.

At autopsy a large collection of blood clot was found lying immediately under the pleura in the posterior aspect of the left chest wall. The clot extended from the midline out to the posterior axillary line and from the level of the clavicle to the diaphragm. The pleura itself was displaced forwards by this clot. The clot extended into the mediastinum and was traced to a slit-like perforation 3 cm. in length in the first part of the descending aorta (Fig. 2). Above and below this perforation the clot had extended into the media of the vessel, forming a dissecting aneurysm.

A large area of softening was present in the left parietal region of the brain, extending inwards to involve the basal ganglia and internal capsule. Microscopically the softened tissue showed marked vacuolization with necrosis of nerve cells. A recent thrombus was present in the left internal carotid artery but not in its peripheral branches. The aorta was generally dilated and its intimal surface presented perivascular infiltration in both the

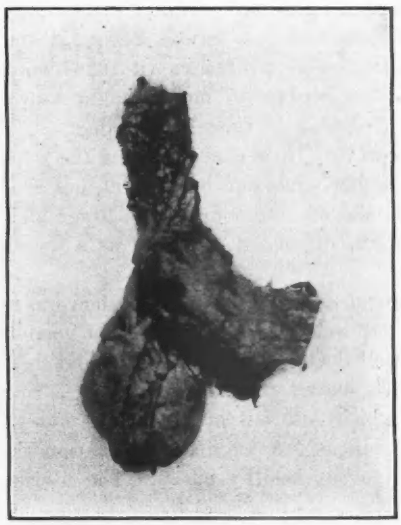


FIG. 2

media and adventitia, indicating syphilitic aortitis.

The kidneys presented an unusual picture of multiple recent infarctions with intense hæmorrhagic extravasations. A generalized arteriosclerosis was present,

Interesting features of this case are (1) the length of life after massive hæmorrhage; (2) the absence of history, symptoms and clinical signs of syphilis; (3) the rupture of a dissecting aneurysm in syphilis; and (4) the occurrence of cerebral and renal infarctions and the marked hæmorrhagic extravasations in the kidneys, indicating a widespread circulatory or vasomotor disturbance, possibly initiated by sudden rupture of the aneurysm.

I am indebted to the Pathological Institute, McGill University for assistance in preparing this record.

A CASE OF SARCOMA BOTRYIODES CORPORIS UTERI*

BY P. J. KEARNS, M.Sc., M.D.,

Montreal

The following report contains a short discription of the clinical history, operative finding, and pathological study of a uterine tumour which was removed by Dr. W. W. Chipman on November 8, 1928, from a nulliparous woman, 32 years of age.

Personal history.—Menses began at the age of 13 and were profuse until 1916, when she began to complain of metrorrhagia which was quite irregular in time and in degree. There had been very little change during the year previous to her admission to hospital, but she then complained of a tumour in the lower abdomen which was diagnosed clinically as a fibromyma uteri.

Physical examination.—The patient was rather pale, but well nourished, and of a good build, with well developed breasts. The abdomen was negative, except for the presence of a rounded mass which rose out of the pelvis mid-way to the umbilicus. A vaginal examination showed a nulliparous healthy outlet. The uterus was upright and its top was lost in a tumour mass which was firm, nodular, mobile, and the size of a four months' pregnancy. The left appendage was palpable, but not the right. The bowel was not involved.

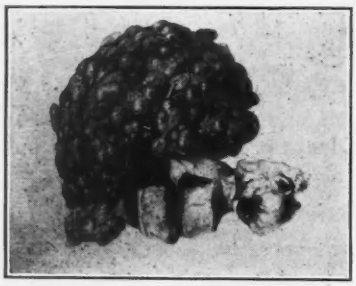


FIG. 1.—Gross specimen showing the uterus with one tube, and ovary attached. Growing from the fundus is the growth described.

Operation.—A cœliotomy was done and revealed a nodular, pedunculated tumour, the size of a fetal head, growing from the fundus of the uterus and gradually extending out toward the broad ligament, especially on the right side. There were adhesions to the bladder in front where a small nodule was growing. A sub-total hysterectomy with removal of both tubes and ovaries was performed.

Pathological study.—The pathological study revealed, macroscopically, a uterus slightly larger than normal, having a grape-like, reddish, soft mass the size of a fetal head growing from the fundus. Sagittal section through the growth showed at the base a radiating, firm, greyish structure which became soft, reddish, elastic and grape-like at its upper pole.

Several sections were taken and various stains were applied to differentiate muscle from connective tissue. The sections from the uterus and cervix were normal, but those taken from the growth show a loose, richly vascular, mesodermic structure, which, in its more mature areas resembled immature, smooth muscle cells. The more cellular areas showed embryonic mesodermic cells rich in mitotic figures and having much extra-cellular material.

Such polypoid, lobulated, grape-like tumours, first described by Weiber in 1867, and later by Pfannestein in 1892, are rare in the body of the uterus (Keitler; *lit.* Frankl), and arise most commonly in the cervix as partly œdematous, partly myxomatous, partly lymphangiectactic, spindle-cell sarcomas, at times with giant cells. (*Lit.* Borrmann).

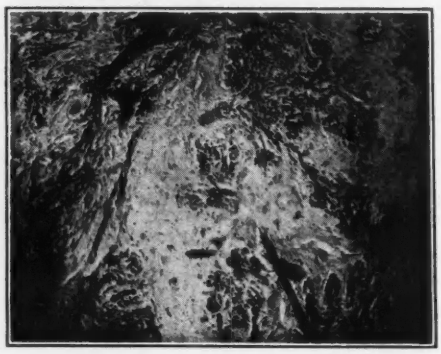


FIG. 2.—A section taken from the centre of the growth, corresponding to the microscopic description in text.

The above described tumour must necessarily be classified under the form designated as *sarcoma botryoides corporis uteri.* This type of growth is rarely described in literature, this being the first to be obtained in our clinic.

* From the Women's Pavilion of the Royal Victoria Hospital, Montreal.

I am indebted to Mr. W. J. Plumpton, our technician, for the technical study of this case.

Full references to the subject can be found in Kaufmann's Pathology **3:** 1669, 1929, Phila., P. Blakiston's Sons & Co., and in Frankl's Pathologische Anatomie und Histologie der weiblichen Genitalorgane **2:** 72, 1914, Leipzig, F. C. W. Vogel.

A CASE OF LYMPHOSARCOMA OF WIDESPREAD INVOLVEMENT AND RAPID TERMINATION

By P. W. Head, M.D.,

Birtle, Man.

Mr. P.S., aged 60, farmer, was admitted to Birtle Hospital on March 21, 1930.

Family history.—Negative.

Past history.—Negative.

History of illness.—Three months previously the patient noticed that the glands of his neck were swollen, hard, and slightly tender. At the same time he had a ringworm on his face and thought that this was causing the swelling. He treated the ringworm, which cleared up rapidly. The glands, however, did not diminish. He was seen when the glands in the neck were still enlarged. At this time there was also a suspicion of enlargement of the axillary glands. His blood picture was normal and, nothing further being found, a diagnosis of Hodgkin's disease was made.

When admitted to the hospital all the superficial glands had become enlarged. He also had difficult breathing, and a dry hard cough. The spleen was enlarged and extended from the midline anteriorly to the crest of the ilium.

Physical examination. — All the superficial glands were enlarged. The throat was congested, the tonsils normal, the teeth in good condition. No nasal discharge. The lungs were clear; the breath sounds were harsh and blowing; no râles; no pleural rubs and no fluid.

The mediastinum was enlarged for the distance of two inches on each side of sternum, from the clavicular notch to the area of cardiac dullness. X-ray examination showed a dense shadow over the whole area.

The heart was regular; blood pressure normal. Hæmoglobin 70 per cent; red blood cells 4,000,000; leucocytes 9,000 (polymorphonuclears 89 per cent), monocytes 11 per cent).

The bowels were regular; no mucus or blood in the stools. Owing to his condition no test meal was taken.

Urine acid, specific gravity 1025, amber, no albumin, no sugar; an occasional leucocyte and epithelial cell; no casts.

The day after admission a gland was excised and sent to Dr. Boyd, pathologist, Winnipeg General Hospital, who made a diagnosis of lymphosarcoma, a small-celled type. From this time on the course was steadily down hill, the dyspnœa increasing, fluid collecting in the pleural sacs, the liver enlarging, œdema of the legs, and ascites setting in. The patient died on April 15, 1930.

CLEANSING OF THE CHALICE.—The Ven. Beresford Potter, M.A., sometime Archdeacon in Cyprus and Syria, writes: I see in your issue of July 16th two observations by "Medicus" and "R" concerning the cleansing of the chalice in the Holy Communion service. This matter was discussed at the last Lambeth Conference, and a leading bishop, I understand, reported that the best way of meeting the difficulty was the adoption of intinction. Nothing, however, was finally settled; but in the proposed prayer book of 1927 (p. 283) the following words were used: "When it is desirable to administer both kinds together the words of administration shall be said thus," etc., and the note was added "that the same order shall be observed, with the permission of the bishop, when it is deemed necessary, through grave danger of infection, to administer both kinds together at the open communion." Although this prayer book has not received the approval of Parliament, there is not the slightest doubt that no objection could or would be made by Parliament to action suggested by this proposal of the bishops and Church Assembly. This I know from a leading opponent of the new prayer book. Many clergy have already agreed to offer intinction, at the open communion, to any communicant desiring it. This can be arranged by such communicants kneeling at the extreme end of the altar rails, and the bread or wafer dipped in the wine while administering to them. The priest would then continue to administer to the remaining communicants in the accustomed way. It should be observed that on and after the Council of Clermont, A.D. 1095, Pope Urban the Second agreed to the custom of dipping the bread in the wine when there was any danger of spilling the wine, and also in administering to the sick. In A.D. 1414-18 the Council of Constance forbade communion in both kinds. It was not until A.D. 1547 that the present undesirable practice, which a great number of leading medical men now condemn, especially in large centres of population, was introduced by Archbishop Cranmer. I understand that a considerable number of people in the English Church, failing an arrangement for intinction, receive only in one kind.—*Brit. M. J.* **2:** 200, 1930.

Retrospect

EPILEPSY*

BY G. F. BOYER, M.D. AND
W. W. BARRACLOUGH, M.B.,
Toronto

It is not the intention of this paper to present the result of any special investigation on the subject of epilepsy, but briefly to review the ideas held regarding some of the factors underlying this symptom syndrome.

In any study of epilepsy, one is impressed by the wide variety and number of diseases in which a convulsive state may occur as a frequent symptom. A list of the lesions of the central nervous system which may be accompanied by convulsions would include: congenital brain disease, traumatic lesions, tumour, syphilis, cerebral abscess, encephalitis, vascular lesions, etc. Other conditions sometimes associated with seizures are sudden anæmia and some cardiac lesions, poisoning by alcohol, lead and ergot, and the metabolic intoxications of eclampsia and utæmia.

Such changes as occur in the various diseases mentioned, however, cannot of themselves be the only factors involved in the causation of a seizure. For example, Sir Percy Sarjent reports the occurrence of convulsions in only 4.5 per cent of cases of gunshot wounds of the head in the soldiers of the British Expeditionary Force, and in only 30 per cent of the patients suffering from tumours of the brain. Less than one-half of the cases of cerebral birth palsies in the later stages exhibit convulsions. It is also well recognized that few individuals suffering from the more severe cardiac affections have convulsions and only a percentage of those patients who develop a toxæmia during pregnancy have seizures.

It would appear, therefore, that in the presence of brain lesions or of physiological abnormalities elsewhere in the body an additional factor, such as undue susceptibility toward a convulsive reaction, is needed to explain the fact that seizures occur only in certain individuals. The term "epileptogenous" has recently been applied to those individuals who appear to have some inherent susceptibility in their central nervous system, causing them to react with a convulsion in the presence of a given stimulus.

So far, we have been considering those cases in which a convulsive state has existed as a symptom in the course of some well-defined disease. There still remains a large, fairly well-defined group of cases in which none of the above etiological factors can be found. These constitute the cases of so-called idiopathic, genuine or essential epilepsy, or epilepsy without known cause. As in the former group, it is also believed that one is justified in assuming the existence of an inherent susceptibility to convulsions. In support of this, is the frequency with which a hereditary factor occurs. Families are met with in which several members have or have had convulsions during a similar age period. Recently we have had the opportunity of examining a mother and her four children. The mother gave the history of having had convulsions from the age of three years to eleven. At the present time, the three older children are having convulsions and in each case began having them at between two and three years of age. The youngest of the family is now eighteen months old and is the only member free. In addition, two cousins on the mother's side are subject to epilepsy.

Burr, from a study of 1500 cases, does not believe that direct inheritance is important in epilepsy, but that convulsions may be evidence of a congenital instability of the germ cell. The predisposition to nervous disease is inherited, but the specific disease which results is dependent on additional causes. The tendency to convulsive reaction may be a structural defect which, with our present methods of examination, we are unable to demonstrate. The study of the neurological mechanism involved in an epileptic seizure has led to the formulation of four distinct theories of causation:

1. The irritation theory, which arose from the experiments of electrical stimulation of the cortex and from the pathological findings in Jacksonian epilepsy.

2. The release or inhibition theory, based upon the more recent advances in the physiology of the nervous system. In this it is assumed that a convulsion occurs, not from stimulation but from a temporary suspension or inhibition of function of the higher nervous centres, which allows the lower centres to discharge explosively.

3. The short circuit theory, which is really only a modification of the supposed release phenomena.

4. The explosive theory. In this, it is suggested that a seizure arises, not as an abnormal spread of nervous impulses, but as a widespread change in brain tissue, dependent upon some sudden metabolic change as anaphylaxis, oxygen deficiency or alkalosis, etc. Modern research has been directed more particularly to the factors concerned in such a metabolic disturbance.

* Read at the Jubilee Meeting of the Ontario Medical Association, May 29, 1930.

Hughlings Jackson, sixty years ago, suggested vasomotor spasm as a possible factor in epilepsy. Recent physiological research has given this old idea some impetus. That the cerebral arteries are supplied with vasoconstrictor fibres through the sympathetic nervous system is now accepted as fact, and it may be assumed that spasmodic contraction of vessels in an area of the brain can precipitate a convulsion.

Excision of the cervical sympathetic has been carried out by various investigators and surgeons, but with indifferent success. It has only been in those cases in which some definite evidence of involvement of the sympathetic system has been present, that beneficial results were obtained. One case reported by Cobb, in which a marked Horner's syndrome, a pseudoptosis with paralysis of the dilator fibres in the iris, was present, ceased having convulsions when a unilateral cervical sympathectomy was performed.

As with all tissues, the proper functioning of the brain is dependent on a continued and adequate supply of oxygen. Oxygen deficiency to the brain, if severe enough, is regularly followed by convulsions. Cases are reported in which convulsions could be induced at will by having the patient breathe air deficient in oxygen. Further, overventilation which also regularly produced convulsions in these cases, would have no effect if the patient breathed an atmosphere rich in oxygen.

Much attention has been given to the various inorganic constituents of blood and spinal fluid. Estimations of the concentration of fixed base, chloride, bicarbonate and phosphorus have been made, as well as the amount of sodium, potassium, magnesium, and calcium. Calcium probably has received the greatest amount of attention because of the well-known relationship between increased irritability of nerves and decreased concentration of blood calcium in tetany, and the relation of calcium to the permeability of capillaries; and also because of its therapeutic effect on myoclonus or the localized muscular twitching met with in certain epileptic patients.

The effect of altering the existing acid base balance in certain epileptic patients is striking. Over-ventilation of the lung with its resultant washing out of CO_2 from the blood and the production of an alkalosis will in some patients induce a seizure. It is suggested that this is due to the fact that tissue respiration, that is the interchange of oxygen between blood and tissues, is interfered with when, in the absence of the normal amount of carbon dioxide, the hydrogen ion concentration of the blood swings more toward the alkaline side although the actual amount of oxygen in the blood is at a maximum.

A study of the effect of acidosis on the other hand introduces another factor. With the increase of the hydrogen ion concentration in the blood, oxygen is freed from the blood to the tissues with increased facility, but, in addition, those inorganic constituents of the blood such as sodium, potassium and calcium are made more easily available to the tissues in ionized form. The influence of these inorganic constituents on the organism may depend upon the relative amount of ionized salt rather than the absolute amount as measured by the percentage of blood calcium or blood sodium as the case may be. The practical application of this principle of acidosis is seen in the use of starvation, dehydration and the so-called ketogenic diet, all of which have been used in the treatment of the disorder. The first has been employed for many years. It is to Wilder and later to Peterman that we are indebted for our knowledge of the effect of induced acidosis by diet. Peterman gives his patients (all children) one gram per kilo of body weight of protein, enough total calories to equal 30 per cent more than their basal requirements, and a ratio of calories from fat which is two or three, even six, times the total calories from protein and carbohydrate. The ratio of fat to protein and carbohydrate is increased until diacetic acid appears in the urine as evidence of acidosis, or, more correctly, ketosis. Although such a diet is very disagreeable, rather beneficial results have been obtained in a certain number of cases. The fact that patients with epilepsy are able to consume and utilize a diet so rich in fat may in itself be of significance.

In all ages, a certain group of persons have believed that the origin of convulsions lay outside of the realm of the physical. To-day some members of the psychoanalytic school go so far as to explain the seizures through an inability on the part of the patient to adjust himself to his environment. Pierce Clark describes the epileptic as an egocentric, emotionally inexpressive, individual imbued by an excessive worship of self. This produces a rigidity and inelasticity of the personality incompatible with flexible living; hence the explosive fit. Although it is very unlikely that anyone of us would be willing to accept this explanation of the convulsion, nevertheless, the fact remains that large psychological factors are present in epilepsy. Patients will frequently say that their attacks occur when their minds are not occupied by outside activity, that when they may be sitting quietly or walking quietly and attention lags a seizure occurs. Or, that often they can "fight off" an attack by suddenly engaging in some activity. On the other hand, the very suddenness of the convulsion with its associated embarrassment induces a sense of apprehension. The patient begins to link up in his mind certain episodes with a convulsion to determine cause and effect. It is but a step further for him to ex-

pect a seizure under certain environmental conditions and he is sometimes not disappointed.

Throughout the course of the illness parents and friends are repeatedly cautioning him not to do this or not to do that; to remain quiet for fear of having a convulsion. This oversolicitation intensifies in the patient's mind the disablement already present. Introspection is encouraged and with the increasing limitation of interest and activity a behaviour reaction develops which is not so much the result of disease as the product of environment.

TREATMENT

The golden opportunity in the treatment of epilepsy lies in its beginning. The detection and correction of an exciting cause may remove the symptoms, but later when the conculsive reaction has become a habit this is usually impossible. A wider recognition of the elements which may contribute to seizures will partially prevent development. Too often the physician, after hearing the story, takes refuge in "epilepsy", prescribes a sedative, and waits. "He may outgrow it" is frequently heard or "the fits may stop with the completion of teething, with puberty, with marriage, with the menopause" or, as someone has said "with death". By proper work or exercise, by sufficient rest and sleep, and by good physical habits, the patient should be put in the best possible condition. The development of a robust physique is a step towards gaining that stable vasomotor system which so many patients lack. In certain patients the regulation of the bowels, or the adjustment of the exercise-rest ratio may be followed by a cessation of seizures. The demonstration that breathing an atmosphere poor in oxygen may induce seizures calls attention to the importance of eliminating nasal obstruction or of increasing lung ventilation and intra-abdominal circulation by proper posture and physical exercise. The clinical dangers of fatigue are well known.

The harmful effect of infection and its relationship to various convulsive states is well recognized and the good results obtained by the removal of infectious foci occur sufficiently frequently to exclude probable coincidence.

Concerning the diet in epilepsy, it is probable that one would find in a search through the literature mention made at one place or another of every known article of food, by one writer to be included, by another to be excluded. Most of these diet lists are empirical and not supported either by experimental data or clinical fact. The diet should be simple and nutritious and only sufficient to satisfy caloric requirements. An exception to this statement is the use of the so-called ketogenic diet for which there would appear to be some real justification. Treatment by limitation of fluids has recently gained some adherents but is still very much in the experimental stage.

Of the various drugs used, bromide has long held first place. The best results are usually obtained with not more than sixty grains a day. If this does not correct the attacks, larger doses rarely succeed and combinations with other drugs are more useful. Some workers believe that bromides are more efficient in the absence of chlorides and, with complete restriction of chloride intake, a bromide replacement occurs which permits of a closer union between drug and tissue and beneficial results are obtained with the administration of a smaller dose. As a rule, bromide, if used, should be continued without diminution of the dose for two years after the last attack and then only gradually lessened through another year. At the present time, phenobarbital (luminal) is the standard drug for controlling seizures. It largely displaced bromides because of the fact that it does not so greatly depress mentality. The usual dose is 1 to 3 grains a day. Sodium luminal, being more soluble, can be given subcutaneously or intravenously. The latter method has been used for some time at Sonyea in their treatment of status epilepticus, 5 to 10 grains being given, with an almost immediate cessation of seizures.

With regard to mental hygiene, it is evident that patients with epilepsy, as with any physical limitation, should not centre their thoughts on the seizures, and as far as possible should see themselves as useful members of the community, if possible they should not be sent to an institution for epileptics unless they have approached the deteriorated mental level requiring such supervision. They should be protected from emotional strain and excitement, but encouraged to do as much as possible to prepare themselves to be or to become self-supporting units. The consummation of this will require the entire coöperation of the patient, his physician and the community at large, for the problem is often more sociological than medical.

INEFFICIENCY OF METAPHEN AS SKIN DISINFECTANT.—The recently published experiments of Raiziss, Severac and Moetsch showing that metaphen in strengths of from 1:500 to 1:2,500 invariably sterilizes inoculated rabbit skin are invalid because the amounts of drug transferred to the subcultures have been shown to be sufficient to inhibit bacterial growth. Metaphen 1:500, tested by a valid method, with exposure for five minutes and subsequent drying, cannot, according to the experience of Edwin C. White and Justina H. Hill, Baltimore (*J. Am. M. Ass.*, July 5, 1930), be relied on regularly to sterilize normal human skin. Different individuals show considerable variation in difficulty of sterilization.

Clinical and Laboratory Notes

NAUHEIM TREATMENT AND CARBON DIOXIDE FOAM BATHS

BY L. SHILLITO, M.B.,

Chief Assistant in the Electrotherapy Department, St. Thomas's Hospital

The warm effervescing waters of Nauheim, in Germany, have become famous for their success in the treatment of cardiac weakness. The water is heavily charged with carbon dioxide, and also contains calcium chloride in solution, with other salts in smaller quantities, and various attempts have been made to introduce "Nauheim treatment" with artificially prepared solutions. Formulæ for this purpose may be found in Kellogg's "Rational Hydrotherapy," or Martindale and Westcott's "Extra Pharmacopœia," but the recent invention of what is known as a bubble or foam "distributor" (Baderost), for use with a cylinder of carbon dioxide and a little saponin solution, makes the whole process far more simple and easy to administer efficiently. It is doubtful whether the calcium chloride used in the chemically prepared baths has any effect beyond raising the specific gravity of the solution, as it is not absorbed, the main physiological effects being due to the carbon dioxide and to the temperature of the bath. The so-called "foam bath" apparatus has only been introduced into this country within the last year, and so far has not met with the serious consideration that it deserves, though on the Continent, and particularly in Germany, it has been widely used for some while with good results.

As I have now had the opportunity of some experience of this new method of giving Nauheim treatment, a practical description may help to popularise a form of treating heart disease of which the good results have long been well known, but in which the practical difficulties of administration were too great for it to be very much used in ordinary practice. All that is now required to carry out this treatment is a foam distributor obtainable either in this country or, more cheaply, abroad, a cylinder of carbon dioxide and the saponin solution, which can be bought from any good manufacturing chemist.

ADMINISTRATION

The distributor consists of three parallel pipes held together in a frame and perforated along their length with a series of holes. Over these apertures are a number of porous blocks of wood. The pipes are joined at either end and connected with the cylinder of gas, which escapes through the porous wood as very fine bubbles. If the bath is filled with water and the gas turned on, a simple æration or bubble bath results; if, however, the distributor is only covered with a few inches of water, to which a little saponin solution has been added, a fine dense foam is formed which gradually fills the bath. The procedure is as follows.

1. Soak the distributor in water for some hours before use to allow the wooden blocks to swell and prevent leakage of gas between them. To prevent it scratching the bath, a rubber mat may be laid under it.

2. The bath is half filled with water at a temperature of 94-97° F. and 20 c.cm. of foam extract (saponin solution) is added. This is mixed well with the water before turning on the gas or air, a point of importance is securing fine foam free from large bubbles.

3. Compressed air is pumped through the distributor until a layer some inches thick of air-foam has been produced. In the absence of an electric air pump, an ordinary motor tire pump can be used quite effectively. The air-foam cover prevents the carbon dioxide from escaping, as carbon dioxide foam will not last unless it is protected in this way.

4. Carbon dioxide is now bubbled through the distributor at a pressure of 0.15-0.2 of an atmosphere. The patient gets into the bath and remains there for 5 to 20 minutes, carbon dioxide being bubbled through the distributor the whole time. A rubber back rest and a folded towel as a headrest add to the comfort of the patient, who should be immersed in the bath up to his neck. The temperature of the bath is maintained by adding more hot water from time to time. No hard-and-fast rule can be laid down for the management of all cases, the duration of the bath and its temperature depending upon the degree and kind of disease, the pulse-rate, blood pressure, and personal idiosynerasies.

5. Before, during, and after the bath its temperature and that of the patient are taken, and also the pulse, a fall of pulse-rate being aimed at. The blood pressure is also taken before and after the bath, a fall likewise being, as a rule, expected.

6. After the bath the patient goes to bed for an hour, and is not allowed to read, write, or talk during this period. The bed should be kept warm with a hot bottle. To destroy the

foam in the bath sprinkle with a jugful of soft soap solution.

7. At the beginning of a course of these baths, a bath for three to four minutes at 96-97° F. is given, and if the effect of this is satisfactory it may be repeated, and the period of immersion subsequently lengthened up to 15-20 minutes towards the end of treatment. The temperature is correspondingly lowered down to 94° or even 92° F.

8. Baths are given on two or three successive days, followed by a day's respite, and then repeated. The average number of baths in a course varies from 20 to 30, and the duration five to six weeks. Baths on alternate days may be found less fatiguing, and with women should not in any case be given during the menstrual period.

On the days when no bath is given "Schott" resisted exercises may with great advantage be carried out if the services of a skilled administrator are available. In the absence of such a person other suitable graduated exercises may be taken.

PHYSIOLOGICAL EFFECTS

1. The type of reaction obtained depends upon the temperature of the bath. Carbon dioxide baths are used practically solely for their effect on the circulation in cardiovascular disease, and in these conditions bathing above an indifferent degree of heat should be discouraged. At a neutral temperature a carbon dioxide bath has much the same effect on the surface circulation as a very hot bath, but has the advantage of avoiding the harmful, primary excitation and secondary depression produced by heat. As Hediger points out, the carbon dioxide bath is the only physical method of treatment in which the heart muscle is trained without at the same time increasing the frequency of the heat. The slowing of the pulse-rate extends the period of diastole and enables the coronary vessels to be better filled with blood, which must tend to improve the nutrition of the myocardium. The blood pressure may fall 20 mm. of mercury during the course of one of these baths. In baths under indifferent degrees of temperature the peripheral vessels are contracted, the blood pressure rises, and consequently the work of the heart is increased. By a gradual increase of the carbon dioxide content and a reduction of the temperature of the bath, the heart can gradually be forced to do more work, and through this increasing exercise its musculature becomes strengthened, the tone increased, and reserve power augmented. The sensation of warmth produced by the strong circulatory reaction allows a lower temperature to be tolerated without shivering.

2. The powerful vasomotor effects are produced reflexly by the adhesion and bursting of myriads of small carbon dioxide bubbles against the skin, stimulating the superficial nerve-endings and producing redness and vasodilatation.

3. Viscera are relieved of congestion and the activity of the peripheral vessels greatly lessens the labour of the heart, and secures a better distribution and a more accurate movement of the blood throughout the body.

4. The increased activity of the skin lessens the strain on the kidneys, whereas diseased kidneys are likely to suffer serious injury from the temporary congestion which results from the contraction of the surface blood-vessels after either a hot or a cold surface application to the body.

5. A continuation in improvement of health for some months after the course of these baths is due, probably, to the comparatively slow and gradual process of repair in degenerated organs, provided, for the first time possibly for some years, with a more healthy and less abnormal circulation.

INDICATIONS

The principal indication is myocardial weakness—for example, the dilated, feeble, and irritable heart following influenza and other fevers. Cardiac toxæmia or enfeeblement caused by excessive smoking or a prolonged illness such as typhoid or malaria, angina pectoris, and cardiac asthma are all benefited by this treatment, as may be also anæmia with dilated heart and high blood pressure.

The treatment is not suitable in heart cases with broken compensation, in very marked arteriosclerosis, or in the very old.

Chronic nephritis may often be benefited, as in this disease the kidneys are likely to suffer serious injury from the temporary congestion resulting from the contraction of surface blood-vessels caused by very hot or very cold applications.

Neutral effervescent baths are also valuable in insomnia and mental excitement generally.

To conclude, the special advantages of the carbon dioxide foam baths are their simplicity, low cost, and the fact that the air-foam cover entirely conceals the patient's body from view, a practical point of some importance. They can be given in a patient's own home, and the distributor can also be used to give a sweating type of foam bath most useful in rheumatic affections.—From *The Lancet* **1**: 1401, June 28, 1930.

CLINICAL NOTES IN OPHTHALMOLOGY

BY LOUIS KAZDAN

Toronto

The following points gleaned in the eye clinic of Professor Moriz Sachs, of Vienna, are reported with his kind permission.

First may be mentioned the method and advantages of dry heat sterilization of surgical instruments used in this clinic. The details are simple. The instruments are placed on a rack at the bottom of a metal box, which has a cover. The box is closed, wrapped in paper to keep out dust, bound with a string and placed in a dry oven at a temperature of 150 C. for half an hour, when the instruments are ready for use. Any oven, the temperature in which can be regulated, is suitable.

At the operation, the nurse partially unwraps the box, without touching its surface and holds it out for the operator, who with sterile hands removes the box from the rest of its paper covering.

The advantages of this method are:

1. It obviates much unnecessary handling of the delicate sharp instruments which are thus less likely to be injured.

2. The instruments are not exposed to the corrosive effect of boiling water. Particularly is this important in the case of the exceedingly sharp and highly tempered instruments used in eye surgery.

3. The instruments are free of any sediment which is often seen deposited on them from dissolved substances in the boiling water.

4. It is conceivable that a dry instrument is less likely to convey extraneous irritative or infective material into the wound than one which is wet, where capillary traction may play a part.

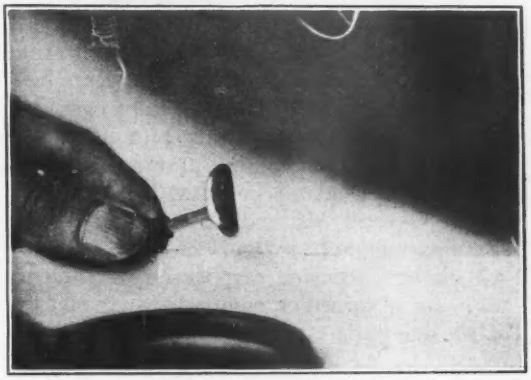
5. The instruments can be had ready sterilized any time previous to the operation and can be taken along, ready for use if necessary anywhere outside a hospital.

To provide for more than one operation at a time, several such sets of instruments were always available, ready sterilized, in this clinic.

W. C. Finoff described the method and pointed out some of its advantages in the *American Journal of Ophthalmology* in 1927, having first observed it in the Clinic of Professor Morax in Paris. The writer has also observed it being used by Dr. W. McLean, of New York, who thought it, likewise, most satisfactory and convenient.

Another interesting point observed in the Sach's Clinic, was the use of a hollowed out and perforated Des Marres' lower lid retractor (See Fig.) This retractor, which was about five centimetres long, was attached by rubber tubing to an exhaust pump and, properly controlled by the assistant, served, while retracting the lower lid, to carry away continuously any fluid that collected in the operative field during the operation. This largely obviated the use of cotton swabs, which sometimes obstruct the operative field from view at a critical moment.

Another point worth mentioning is in connection with the replacement of the iris after cataract operations or iridectomy for another purpose. It was observed that gentle stroking of the sclera with the spatula in the neighbourhood



The combined retractor and suction tip

of the section was often of itself sufficient to replace the iris, thus obviating the introduction to an iris repositor into the wound.

Another observation was with relation to the position of the operator, which differed from that in American clinics. In this clinic, as well as in other eye clinics in Vienna, the operator works while sitting down in front of the patient and not, as we are accustomed to operate, standing up and from behind the patient's head. It is claimed that the operator can more easily relax in the sitting position, and being in front of the patient he does not bend over the operative field, which is a consideration from the point of view of asepsis.

Finally may be mentioned the observation of patients being led back walking from the operating table to their beds after cataract extraction. So marked was this contrast to the care with which a patient is transported back to his bed after cataract extraction in American clinics that the writer commented upon this fact. During the discussion, he was informed that the very careful handling of the patient immediately after the operation was found unnecessary, after it had been observed that even in patients who had been quite unruly, prolapse of the iris practically never occurred within the first twelve hours after the operation. Indeed, during the period of seven months spent in this clinic, in which time upwards of a hundred and thirty cataract extractions were observed, no untoward effect had been seen, attributable to patients having walked back to their beds from the operating room.

Editorial

MEDICAL EDUCATION AND RELATED PROBLEMS IN EUROPE

UNDER this caption, the Commission on Medical Education has issued a report prepared by its very efficient Director of Study, Dr. Willard C. Rappleye, on his recent visit to some of the representative medical centres in Europe. Dr. Rappleye was present at lectures and teaching exercises in laboratories and hospitals, and conversed with students, instructors, practitioners and others. In England he attended a session of the General Medical Council and at the examinations of several of the medical schools and licensing corporations. In such ways he obtained a comprehensive picture of the methods of training and of problems related to medical practice in the several countries visited.

In the report, which extends over two hundred pages, there is comparatively little comment, critical or otherwise. It is mainly an impartial presentation of facts gathered and collated, with a ready appreciation of the circumstances which have determined the differences in the methods of different countries. The variances in demands in respect of pre-medical education, pre-clinical and clinical training, examination methods, etc., are clearly indicated, and the influence of the sickness insurance schemes in vogue in several countries on the curriculum and on medical practice is at least inferentially set forth. In this review, little will be attempted beyond an endeavour to summarize the outstanding features of medical teaching in the countries which Dr. Rappleye visited.

In Great Britain, the reader learns, the universities require a higher standard of preliminary education than the corporations, such as the Royal Colleges, although the "licentiate" of such a corporation is admitted to registration by the General Medical Council equally with the university graduate. While universities may admit students who have not met their matriculation requirements, such students cannot obtain the university diploma, but may nevertheless be licensed, after examination, by a corporation. This accounts for the heterogeneity of the student group, and, as repeated appearances for examination are permitted, for the length of studentship in some instances. An analysis of the records of those who were registered as medical students at the beginning of the course shows that nearly nine per cent of those who qualified for medical registration in 1927 had spent nine years or more at medical study. Less than two-thirds had found it possible to complete the course under six years. The average length of the courses taken at the different universities by graduates of that year varied from five years and two months at Belfast to seven years and two months at Oxford. The traditional policy of the British schools to make the training primarily practical in character is being maintained, and seemingly there is no disposition to lessen the endeavour to correlate the several subjects of the curriculum.

In Germany, the student is theoretically free to follow his own bent, but he is nevertheless under the necessity of meeting definite State requirements in order to qualify for admission to each of the two sets of examinations. This fact determines, in a general way, the order in which subjects are taken. The general plan of medical education is governed by regulations issued by the Minister of the Interior, but the several schools are consulted before the regulations are issued. The pre-clinical courses are largely didactic or demonstrative, comparatively little laboratory work being required. The supply of anatomical material for dissection is so limited that demonstration is replacing dissection by the student in some schools. In pathology, attendance on lectures, demonstrations and laboratory work is not required, but most students either attend lectures or obtain experience as volunteer assistants. In the clinical subjects, also, the teaching is mainly theoretical and demonstrative, little opportunity being

given the student to acquire experience at the bedside. To meet the requirements of examination, the student usually finds for himself some means of securing clinical training and experience. Younger members of the teaching staff add to their income by giving supplementary courses of a practical clinical nature, which are quite generally taken by the students. Much responsibility devolves upon the student, who usually finds it necessary to seek out a hospital which is not connected with a university for his clinical experience. The uniformity of requirements throughout Germany encourages migration of students from school to school. The medical course is thus rather haphazard, and to offset this a practical hospital year after graduation is now a requisite for admission to medical practice.

Emphasis on the clinical training still characterizes medical teaching in France. Clinical instruction begins simultaneously with that in the medical sciences, and by the time anatomy and physiology are completed, two-thirds of the required lectures in general medicine and surgery may have been attended. Competition for externe hospital appointments, which are available to third-year students, is very keen, and, while attendance at clinics is optional in the first year, all attend clinics from the first in the belief that this will assist them in securing externeships. Externeship is requisite for later interneship, which may be obtained after one year of externeship. The system places the teaching of the medical sciences at a disadvantage and favours its neglect. In consequence, students crowd special intensive courses, for which large fees are exacted, in the medical sciences and in physical examination, history taking, laboratory diagnosis, etc. About one-third of the students secure externeships, while from ten to twelve per cent are advanced to internships. The interne obligates himself to four years of service to the hospital and cannot graduate before he completes this term. Hence for the best students, the medical course is about eight years in length. A student who has failed to get any hospital appointment may get through in five years, while for one who succeeded in obtaining an externeship, but not an interneship, the course may be of any length between five and eight or even more years. An exception to the system which is general in France is to be found at Strasbourg, where much more emphasis is laid on the medical sciences and where two years must be spent in their study before the student is permitted to enter the clinical services.

Austrian methods are very similar to those of Germany, except that the course may be covered in ten semesters instead of eleven. In Switzerland the course of study is quite analagous to that of Germany, even in the French-speaking sections of the country. In the Netherlands, also, the German system is followed, although the course is longer (covering seven years) and much more laboratory and practical work is required. Denmark also requires seven years. The semesters are short, only about three months each, but the long holiday, between May and September, is commonly used to obtain clinical experience. In that country any physician who desires to take charge of obstetrical patients in his private practice must spend one month as a resident on an obstetrical service after graduation, and everyone who takes up a specialty must obtain a specified training in his particular branch.

The medical curriculum in Sweden is much longer and otherwise differs from that in the other countries mentioned. Biology, chemistry, and physics, are pre-medical subjects, in which respect there is agreement with France. Clinical instruction does not begin until the fourth year, and this may extend from four to six years or even longer. Clinical work is carried on throughout the twelve months of the year, first for six months at each of medicine and surgery, then for shorter periods at each of obstetrics, pædiatrics, and other clinical specialties, and then a repetition of such concentrated courses with, finally, two months in medicine and one month in surgery. In all eighteen months are devoted exclusively to medicine and nine months to surgery, in addition to the time given to the specialties.

W. H. HATTIE.

OCCUPATIONAL CANCER IN AMERICA

OCCUPATIONAL cancer is of great interest to students of the cancer problem, since in this condition the exciting etiological agent in many cases can be determined. It is true that the ultimate substance in that agent has not been found, but the fact that the carcinogenic principle is contained in a particular material narrows the search very materially. These occupational cancers are nearly always found in the skin and are usually associated with work in tar, pitch, and oil.

It has always been a rather puzzling matter why occupational cancers should be quite common in England but very uncommon on this Continent. Heller[1] has recently gone into the question and has been able to discover a considerable number of cancer cases among tar and oil workers in different parts of the United States. He has confined his study to the tar, pitch and oil tumours and has not considered the growths of arsenical origin, the aniline tumours, or the lung cancers of certain miners.

There is little doubt that tar and pitch epitheliomas are commoner in England and in Europe than on the North American Continent. Most cases of tar cancer from abroad come from the process of distilling tar. In the United States it is usually coke-oven tar which is used for distillation and this has never been associated with a high cancer incidence. Heller reports 37 cases of cancer caused by tar and tar products. Most of these were caused by gas-house tar and pitch.

In England the shale oil industry has produced a good many cases of epithelioma and the scrotal cancers of mule-spinners have been attributed to mineral oil. Kennaway[2] and others have shown fairly conclusively that the carcinogenic substance, in oils at least, is present chiefly in those oils which are heated to a very high temperature (800° C. and over). Heller reports 21 cases of cancer caused by mineral oils. All of these were workers in crude oil. He believes that the oils vary in carcinogenic activity according to their olefin or unsaturated hydrocarbon content. He does not think that the purified or refined oils are cancer-producing and is of the opinion that the sulphuric acid used in the refining either removes or destroys the irritating substance.

Mule-spinners' cancer of the scrotum has been the subject of considerable controversy since Southam and Wilson's[3] original report in 1922. Mule-spinning is apparently a dying art in America, for in 1926 there were 1,105 mule-spinners employed in the United States according to the Mule-Spinners' Association and in 1929 only 550. Hoffman[4] looked over the death certificates of the United States Division of Vital Statistics and found 33 deaths from cancer of the scrotum in 1926 of which 6 were among textile workers. Three of these 6 were mule-spinners and an enquiry into their history showed that two of them were of English origin and the other was from Canada. Heller was able to find in the records of three Boston hospitals only six cases of scrotal carcinoma in mule-spinners between the years 1887 to 1928 and three of these had very probably contracted the disease in England.

It seems evident from this study of Heller that occupational cancer is by no means confined to the older countries. It is only necessary to look to find cases on this side of the water.

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FRANK G. FEDLEY.

SHOULD MORE DOCTORS ATTEND HOSPITAL CONVENTIONS?

THE practice of medicine down through history has been a constantly shifting stage, a field in which our interests have been ever changing, broadening, and readjusting themselves with almost kaleidoscopic activity. As the progress of scientific development has advanced, the field of medical interest, of obligatory medical interest, has accordingly broadened. And of the many allied activities which now demand the attention of the physician, none are so worthy of his thought, none have so deeply placed him under obligation as has the hospital.

Time once was when the doctor knew not the benefits of hospital facilities, when, with methods crude and lacking help, he worked as best he could. But to-day, especially for the surgeon, the obstetrician and the pædiatrician, the co-operation of a well-directed, well-equipped hospital has revolutionized medical practice, has permitted surgery absolutely impossible on the kitchen table, has removed the nightmare from the practice of obstetrics, has made possible the proper study of diabetic or nephritic patients, and has been instrumental in the saving of countless thousands of lives. It is quite true that the hospital could not carry on without the aid of the doctor, but it is almost equally correct to say that modern efficient medical practice would be impossible without the hospital.

One hears many criticisms of this profession of ours which we love and respect so highly, some unmerited and ridiculous, others warranted and salutary, but one which is frequently heard by those whose work brings them intimately into contact with hospital boards and directors is that all too frequently the interest of many medical men in their hospital does not extend beyond their own personal interests or those of their patients. With this statement is frequently coupled the comment that we, as medical men, are so keenly interested in the scientific side and, with that in mind, are so urgent in our requests for the most modern and elaborate equipment that we lose sight of the need for economy, of the necessity to balance the hospital maintenance budget.

Undoubtedly we all, boards of trustees and medical staffs, could profit by a wider realization of the many varied problems of hospital work, and one of the occasions upon which this "get-together" is possible is the annual convention of the provincial hospital association. The hospitals in most of our provinces are banded together in very active associations and the programs at their annual conventions are most interesting and highly educational. It is a matter of regret that in many of the provinces the attendance of medical men, other than medical directors, is altogether too low. There are, of course, extenuating circumstances. One cannot go to all conventions; parts of the program may not be of vital concern to the doctors; one may not know many delegates before going, etc., but the fact remains that problems are discussed there which are of real concern to the doctor, which he only can answer, and in the discussion of which his opinion would be of inestimable benefit to the others present.

Many questions come up at hospital conventions concerning the rights and privileges of doctors, especially in the smaller hospitals, and all too often they are "settled" without a medical man *in active practice* being present to present or defend the medical viewpoint. Recently, from the records in the library of our Department of Hospital Service, a few questions were selected which have come up in the round-table discussions at some of our hospital conventions; these round-table Conferences are now a leading feature of the programs at these meetings. A few of the questions recently raised are as follows:—Should the operating room supervisor act as first assistant to surgeons? Should the doctor be permitted to charge for services to private cases in public wards? What is to be done when staff members openly resent reorganization efforts of trustees? How can we remove undesirable doctors from the staff? Has the operating room supervisor the right to refuse permission for a clean non-urgent laparotomy immediately following a septic case? How extensive surgery should be permitted in small hospitals? Should nurses

take verbal orders from doctors? What should be done when doctors do not come at the appointed hour for operations? Should pupil nurses select their own physician? To whom do x-ray films belong? Has another doctor the right to see these films?

These are but a few of the many questions discussed and answered at these conventions, and it is obvious that more medical men should be present to help mould hospital policy. The possibilities for service and the very reputations of both doctor and hospital depend upon the closest mutual co-operation. The sooner the physician or surgeon takes a little time off to study the general problems of his "workshop", the more efficient and co-ordinated will our health work become.

G. H. AGNEW.

Editorial Comments

American Students in British Colleges

At a recent session of the General Medical Council of Great Britain a report was received from the Special Committee dealing with foreign and colonial students, stating that a considerable number of American students had applied to many of the medical schools in Great Britain asking to be allowed to take the remainder of their course of study in that country. The Committee had found it difficult in the absence of authentic information to assess correctly the value of the certificates of education which had been submitted, and also the evidence of having passed examinations equivalent to the pre-registration examinations demanded in Great Britain. The Council after deliberation decided that while it desired fully to recognize all the terms of the arrangement between the conjoint boards in Great Britain and the National Board of Medical Examiners in the States, nevertheless it was felt very desirable that every application from an American student should be endorsed by the Dean of the Faculty of Medicine of a school which was a member of the Association of the American Colleges. This demand was made to prevent students who for one reason or another had not been considered satisfactory as students in their own country. In connection with the above a short abstract is quoted from a letter of Dr. Ray Lyman Wilbur to Dr. Gray of the American Medical Union, which it was considered expressed the viewpoint of the American colleges as well as those of Great Britain. Dr. Wilbur writes: "I am very much in favour of a certain percentage of our American students studying abroad, but I think those who do should be drawn from our better students and not belong to any inferior group." The Committee asked for a further remit to consider the matter and promised to report to the council at the November session and give detailed suggestions for co-operation with one or more of the teaching bodies in the United States.

A.D.B.

Dental Radiograms

In a recent editorial in *The Lancet** the writer calls the attention of the profession to an excellent article on dental radiograms, by Mr. Bowdler Henry, accompanied by a series of x-ray illustrations, and emphasizes the necessity for exact pathological knowledge and careful study in their interpretation. The doctrine of focal infection has brought dental sepsis into the limelight as a cause of disease, and has provided the doctor with a possible source of infection in some intractable conditions on which he is apt to place too much reliance. It has become a common practice among doctors to send patients to have their teeth radiographed. If the radiograms and the reports which accompany them seem to suggest the existence of infection in the teeth, the patient is promptly referred to a dentist for the appropriate treatment which generally is of drastic character. This procedure has unfortunately brought with it some unhappy results. Radiograms have their fallacies, and these fallacies are increased if the radiograms are technically imperfect. Their interpretation requires special knowledge, and the reports, even if the radiologist has special dental training, should be considered in a guarded way, for as Mr. Henry has aptly put it, the radiogram is only one link in the diagnostic chain. Every dentist is familiar with cases in which the radiogram has provided evidence of dental infection not otherwise discoverable. In other cases the radiogram may be favourable while the clinical evidence provides proof of an infected condition. A report by a radiologist not specially versed in dental pathology on the other hand may be very misleading. The final assessment must always remain the function of the dentist, though co-operation is desirable before too drastic treatment is permitted. There has been a widespread tendency among both doctors and dentists to assume that all areas of bony rarefaction round

* P. 88, July 12, 1930.

the apices of dead teeth are of equal importance and provide clear evidence of focal infection calling for operative treatment. This however may not always be so, and the presence or absence of sclerosed bone may have considerable significance. Weston Price considers that this granuloma represents a barrier put up by the tissues against the infection in the tooth, a condition which at one time may be harmless, as the quarantine is sufficient to hold the dental infection in check, and at another time may be a danger, because either the infection shows indications of increase or that the resistance has diminished. Here lies the importance of studying the minute and intimate bone structure which is only possible in radiograms of high technical quality. As Mr. Henry has pointed out in his article, such a radiogram requires careful study under proper conditions of illumination and magnification by one who has knowledge of the structure of the teeth and jaws.

A point of great importance well brought out in Mr. Henry's article is that infection may exist in the edentulous jaw. It is important that the radiographic examination of the jaw should include edentulous areas; the saw-like or feather-edge appearance of the alveolar border sometimes seen in the edentulous jaw is a condition which not only leads to difficulty in the successful adaptation and wearing of dentures but also constitutes in some cases a focus of infection liable to be overlooked. A.D.B.

HEALTH ASSOCIATIONS AND CLINICS IN MASSACHUSETTS

The growth of health clinics and organizations under various names has been so rapid during the past few years that a committee of seven was appointed by the Massachusetts Medical Society to consider the relation of the physician in general practice to the special clinics, health associations, and industrial clinics, which have been organized in recent years; to determine the functions which each of these agencies can best fulfil in the interest of the public health, to suggest such modification of conduct as will aid these agencies to accomplish these functions and to recommend to the Council a plan of conduct in accord with the code of ethics now accepted by the society and applicable to the health agencies as well as to the physician in private practice; to the end that all of these activities may be coordinated, and that they may be able to continue to work happily and effectively in the protection of the health of the community.

The committee has studied the situation outlined. While medical feeling in regard to health organizations and clinics is variable, depending on the source, it is safe to say that there is a considerable feeling of distrust on the part of the profession against some or perhaps all of these associations. They have sprung up unhampered by tradition or ethical codes and, sometimes goaded by the necessity of administering funds and legacies, they have altered their methods and enormously expanded their activities. Having already entered in some fields into actual competition with individual physicians, it would be strange if distrust had not arisen. This distrust is not mitigated in the slightest by the fact that physicians often occupy prominent places in these organizations.

As long as the spirit of competition between practitioners and associations prevails the present difficulties will continue. To curb this spirit there should be a declaration of purposes and principles on both sides. Probably the present code of ethics is a sufficient declaration on the part of the practitioners. The associations have as yet made no commitments as to their or future intentions. Until some such commitments on their part are made the grounds upon which a truce or compromise can be made are lacking, and no satisfactory solution of the problem is possible.

Of course the attitude of the public is that it wants the best service at the lowest price. The public too believes in advertising. To this same public, medical etiquette is completely incomprehensible. Far too often the public believes that the organized medical profession is actuated by entirely selfish motives. While it is true that medical ethics is for the protection of the laity, yet an annoyed public could go far in destroying these same medical ethics. In the last analysis the public will have its way. It is the belief of the committee that a policy of energetic medical leadership in these health organizations is far preferable to open combat before the bar of public opinion. Likewise, it seems far preferable to attempt to secure the adoption of the ethics of the profession by these associations rather than by default to allow these associations to drift into the adoption of the standards of business.

The relation of the physician in general practice to the clinics would seem to be adequately covered by the same code of ethics that now governs the physician in relation with his fellow physicians. If such an application of the code of ethics were applied to the clinics the physician would in his relations with such clinics, acknowledge: (1) that sound medical learning should be upheld in the community; (2) that a spirit of competition considered honourable in purely busines transactions cannot exist between physicians and clinics, without diminishing their usefulness and lowering their dignity; (3) that all patients have a right to expect that their diseases will be thoroughly

and properly treated, and that patients have a right to employ whomsoever they wish and believe capable to administer such treatments; (4) that their relations should be governed by strict rules of honour and courtesy, should be such as to secure mutual confidence and good will, and should not be calculated to divert to themselves the patients or the practice of others.

The committee suggests that the clinics, except in cases of emergency, should not consent to take charge of the patient of another clinic or practising physician unless the regular attendant has been duly notified. If called upon to take charge in case of accident or other emergency they should relinquish their care of the case as soon as the regular attendant is able to resume responsibility.

The clinics, in addition to their responsibility to the patient, which is, broadly, the same as those of the practising physician, have often other responsibilities to the public which supports them. They are often the trustees of funds that have been donated for charitable purposes. Some of them frequently turn away patients who cannot pay their fees. Others are in the habit of taking all who come regardless of their right to benefit by the use of public or charitable funds. . Such unjust practices should be regulated regardless of the effect of such regulation upon the popularity, growth, or prestige of the clinic.

As aids to the effective and happy coördination of the activities of the health agencies and practising physicians, the committee makes two recommendations: (1) As far as possible the Medical Society or its branches should undertake the medical responsibility or at least supervision of these special clinics. The time has come for a more aggressive attitude on the part of the profession, an attitude that will not subject the profession to the criticism of inactivity. That such a procedure is feasible is demonstrated by the Cancer Clinics of the state. (2) The Medical Society should in every way possible develop activities looking toward post-graduate instruction of the profession. The practising physicians have been and as far as can be seen will always be the chief factors in the health of the community. The early detection of tuberculosis, or of cancer, the treatment of heart disease, prenatal supervision, immunization against diphtheria, health examination, etc., are the duty and privilege of the practising physician. Many vital details of each of these have doubtless been developed since they went into practice. To facilitate their familiarity with the ever-changing tools of their profession is an important function of their Medical Society.

Could not our Canadian Medical Societies take a leaf out of the Massachusetts book?

LILLIAN A. CHASE

PREVENTIVE MEDICINE AND PRIVATE PHYSICIANS

Under the above heading, the weekly bulletin of the Department of Health of New York City presents a plan to promote the practice of preventive medicine by private physicians.

Physicians are asked to set aside some hour or hours for the examination of well children, at which time they will do vaccinations and immunizations. Physicians are asked to advise the Department of Health of their fee for health examinations. The idea is not to have a standard fee, but to have in the Health Department a list of physicians and their fees. It is recommended that the department furnish to parents, upon request, the names of the three nearest doctors maintaining a "Children's Hour", at the same time, stating their fees.

A form letter covering these points is supplied to physicians, which they may send to their patients. It is stated that many parents would take their children to the family physician for health supervision if they knew that he would give such care, and also if they knew, in advance, what his fee would be.

The following quotation is of interest, and illustrates an awakening of the medical profession to the popular demands: "In the present crisis facing the medical profession, it must be borne in mind that the people are becoming increasingly more insistent to have adequate health and sickness service provided at cost, within their financial means. Compulsory insurance, state medicine and other projects have a considerable following, and unless the medical profession takes an active part in meeting the legitimate demands made upon it by the public, it will find itself confronted with the enactment of schemes which will deprive it of the liberty of action it so highly prizes."

A. GRANT FLEMING

THE BETTER PRESCRIBING OF DRUGS

The attention of our readers is called to the fact that articles will appear at monthly intervals in our *Journal* on the prescribing of drugs, particularly in connection with the most effective ways of covering unpalatability, and, to some degree, the determination of suitable dosage. These articles emanate from the Department of Pharmacology of the University of Toronto and represent much study and experimentation on the part of Prof. V. E. Henderson and his associates. Besides being Professor of Pharmacology at Toronto, Dr. Henderson is the Chairman of the Association's Committee on Pharmacy. The series of articles referred to will be particularly valuable as they are based not on theory but on practice, and coming from the

source they do, will be accepted everywhere in Canada as authoritative. Nowadays when medical men are in danger of being dragged by the heels by the manufacturing pharmacist, and prescribing is becoming a lost art, it is highly desirable that we should get back to first principles. Only in this way can the physician maintain his position as a scientific practitioner. The work of Professor Henderson and his associates will facilitate the task of regaining the high road, and their articles should be carefully studied. The first of the series is to be found in this issue. It is by Dr. J. F. Johnston, and is entitled "The Flavouring of Expectorant Mixtures." A.G.N.

CANADIAN MEDICAL BIOGRAPHIES

Elsewhere in this issue will be found a charming little sketch by Dr. Corrigan, of Lampman, Saskatchewan, of the life of one of the "old-timers" in Canada, Dr. Clarkson Freeman. This biography is a good example of what a little interest and industry can do in resurrecting forgotten lore. No doubt there is much material of this kind still accessible, and it is entirely desirable that family records and traditions be studied with a view to recording pictures of medical life and social experiences of the pioneering days before it is too late. Dr. Corrigan deserves the thanks of the profession for what he has done and is doing. May others do likewise. A. G. N.

Special Articles

RADIOACTIVE WATERS: A STATEMENT OF THEIR ACTIVITY*

PREPARED UNDER THE DIRECTION OF THE COUNCIL, CANADIAN MEDICAL ASSOCIATION

INTRODUCTION

The discovery of the wonderful physical properties of radium awakened a tremendous development in physical studies. The application of the knowledge of x-rays to the treatment of disease led naturally to great hopes that radium would prove of the greatest value in the treatment of disease in man. These hopes, as every physician knows, have been, in part at least, fulfilled. A very large part of the available radium in the world is being employed in the treatment of cancer and of other diseases. But we have learned that it is a dangerous remedy, and must be employed with the greatest care. Further, it has been most successfully employed when its rays could be brought to bear on a local area in relatively high concentrations. The rays emitted by radioactive substances in a sufficient concentration damage or affect all cells with which they come into contact, but abnormal cells are much more susceptible to their effects than normal ones.

*This statement has been prepared for the information of the physicians of Canada by a committee composed of:—

Dr. Arnold Clarkson, Assistant Professor of Medicine, University of Toronto; Dr. A. H. Gordon, Associate Professor of Medicine, McGill University, Montreal; Prof. V. E. Henderson, Chairman Committee on Pharmacy, Canadian Medical Association; Dr. D. A. Keys, Professor of Physics, McGill University, Montreal; Dr. D. S. Lewis, Assistant Professor of Therapeutics, McGill University, Montreal; Dr. G. E. Richards, Chief Radiologist, Toronto General Hospital, Lecturer in Radiology, University of Toronto; Prof. J. Satterly, Department of Physics, University of Toronto.

PHYSICAL FACTS

There are more than forty radioactive elements, of which perhaps the best known are radium, uranium, and thorium. These elements are not stable, but emit one or more of three types of radiation or rays, and in doing so change into other elements.

These rays are named by the first three letters of the Greek alphabet—alpha, beta and gamma. The alpha rays have been shown to consist of helium atoms moving at so high a speed that they have been stripped of two electrons. The alpha rays have a powerful surface effect but will not penetrate through the skin. Beta rays are high speed, negatively charged, particles which will pass through about three-eighths of an inch of tissue. Finally, the gamma rays are highly penetrating and resemble the X or Röntgen rays. The intensity of these rays is diminished twenty-five per cent in passing through four inches of body tissue.

Radium atoms disintegrate at such a rate that half of them remain unchanged after two thousand years, whatever be the original number present. A radium atom ejects an alpha particle, and the residue is a new atom. These new atoms constitute a gas called "radium emanation," niton, or radon. In turn it emits alpha particles, and gives rise to a series of solids, or active deposits, named after the capital letters, Radium A, B, C, etc., ending in a stable form of lead. The radium emanation, or radon, breaks up, so that there remains but half the original quantity in 3.86 days, and only one-quarter of the amount in double that time, one-eighth in three times the time, and so on. In a month then, practically all the radon, if isolated, will have disappeared.

The amount of radon in equilibrium with one gramme of the element radium is defined as a curie of radon. A thousandth of this as a

millicurie, a millionth as a micro-curie, and a thousand millionth as a millimicrocurie.

Radioactive waters are usually those which (1) contain radium and its subsequent products, including radon, and (2) those which do not contain radium but do hold in suspension radon, or radium emanation. If a water containing the emanation only is bottled, then the emanation will diminish to half its value every four days or less, so that at the end of a month less than one per cent will remain. If, however, the water contains radium, then on bottling there will be present after a month or so an equivalent amount of radon, at the rate of one millicurie of radon for every milligramme of radium.

Radium is very widely distributed in minute quantities in rocks, soils, rivers, sea water, trees and animals. There are some wells and springs, however, which contain either radium or radon in much larger quantities than the average.

STRENGTH OF CERTAIN SPRINGS CONTAINING MORE THAN USUAL AMOUNTS OF RADIOACTIVE MATERIAL

Country	*Spring*	*Radioactivity expressed in millimicrocuries per litre*
England	Bath, King's Well	1.73
France	Choussy, La Bourboule	22.9
Austria	Joachimstal	70.0
Germany	Baden-Baden Buttquelle	45.0
U. S. A.	Arkansas Imperial	10.0
Canada	Kootenay, Radium Hot Spring	9.6
	Banff, Cave Spring	0.47
	Radnor Forges Spring	0.345

MEDICAL OPINION

It has long been a disputed point whether the drinking of mineral waters in itself does much good. The great mineral springs vary immensely in the salts they contain, yet beneficial results in many diseases are produced by residence at almost any of the great spas. The reasons for this seem largely to be:—(1) the careful regimen of diet and exercise; (2) the drinking of larger amounts of water than usual; (3) in part the absorption and excretion of the salts themselves which increase the flow of urine (it is in fact the taking of an internal bath); (4) the relief from the daily grind of life and the wise advice of experienced physicians. All these things have definite psychological effects. Now it was natural that when certain of the great spas found that their waters were radioactive their physicians should ascribe to the radioactivity much curative action which they could not otherwise explain, but as more and more of the waters were shown to be radioactive, and as it was found that such highly radioactive waters as those of Joachimstal did not produce more striking effects than those whose radioactivity was one-hundredth or one-thousandth the strength, the claims based on radioactivity have greatly decreased.

Let us now introduce some comparisons between the radioactivity employed by the radiologist and that contained in radioactive waters. For the superficial destruction of a wart, on an eyelid for example, the radiologist carefully screens the face save in the region of the wart. He then places in contact with the skin a capsule with some 35 milligrammes (½ gr.) of radium. The alpha rays do not escape from the radium container. Indeed, they will not penetrate the skin, and a sheet of paper would stop them. The beta rays penetrate further into the skin, and it may be their action which causes the death of the cells and organisms in the wart. The gamma rays, fewer in number, pass more deeply but in the amount and concentration present in this case seem to do no harm if little good. In all probability the effect they have, when present in high concentrations, is due to their striking some molecule in the body so directly that from it a secondary beta ray is dislodged.

A litre of water from the famous mineral springs at Joachimstal, which is one of the richest in the world, and far richer than any spring in Canada (see table), contains seventy millimicrocuries, *i.e.*, about one two-millionth part of that applied to the eyelid as described above. Suppose a patient drinks one litre, then this small amount is spread over the stomach and very quickly over the intestine. In the stomach alone the effect will be spread over more than 500 square centimetres. As some of the water passes rapidly into the intestine we may make the assumption that it is spread over some 1,000 square centimetres, with a reduction of the dose and intensity by another 1/1,000, or a reduction as compared with that applied to the wart of 1/2,000,000 x 1/1,000 or one-two-thousand-millionth. This means a catastrophic reduction in efficiency, and the gas, the radon, diffuses into the blood stream, reducing to an infinitely small amount the local concentration anywhere and is rapidly breathed out through the lungs.

There is little wonder that the Council on Pharmacy and of the American Medical Association have stated that *they will not consider any water as having a possibility of therapeutic activity which does not possess a radioactivity of more than two microcuries per litre.* It has been calculated that to obtain this dose by drinking one gallon of water a day the radioactivity of the water would have to be about 500 millimicrocuries per litre. Joachimstal water contains 70. One would have to drink seventy-one gallons at least. Of the springs at Bath one would have to drink about one hundred and sixty-three gallons.

That radioactivity in a mineral water adds little to its value has been decided by the highest courts in Canada, after an exhaustive investigation, and after taking evidence from the highest authorities in the Empire, including Prof. Frederick Soddy, Prof. Sidney Russ, and Dr. Robert Fortesque Fox. Both the Exchequer and the Supreme Courts of Canada agreed in the judgment that radioactivity did not confer any special advantage on a mineral water. "It is

not established that there is any connection between the therapeutic properties of the spring and the radioactivity of its water. If the water, for this or any other reason, possesses any therapeutic value there is no reliable evidence of it. The water coming from the spring is hot, which is always a novel condition, attractive to many people, and may be utilized to attract tourists and persons in ill health. In this sense only do I think the water of the spring possesses any special value." The court here gives expression to what seems to be the general belief of physicians in Canada, in the United States, and to a large extent in England, that mineral waters have no great therapeutic value, that they, as such, rarely cure or even alleviate the sufferings of patients, though the regimen of diet, baths, and water drinking, may do so in certain cases.

It may be pointed out that many radioactive waters are so unpleasant, owing to the presence of other salts, that they cannot be drunk in any quantity, and, consequently, the direction is given that they should be diluted before use, a tablespoonful to the glass for example. Every time the bottle is opened radon escapes; in pouring and measuring more escapes. The dilution again reduces the efficiency and penetrative power five to ten times. Still more ridiculous is the suggestion that the radioactive water should be added to a bath of water.

It may be claimed that benefit in some cases does ensue, but every physician is well aware of the tremendous psychological effects of any new treatment in which the patient has faith. Take a case of arthritis reported to the Committee, where teeth with pus pockets had been removed some weeks previously to taking a radioactive water. After taking the water for a few weeks the patient was better. Was the effect due to the water, or to the previous treatment? In view of the above, which is the more probable?

WATERS CONTAINING RADIOACTIVE SALTS

Let us pass on to the consideration of water that contains radioactive salts rather than emanation. Once such a solution enters the blood stream any radioactive salt will be precipitated. The infinitely small particles are picked up by the cells lining the blood spaces, and it is found that they are gradually carried to the liver, the spleen, and more important, to the bones. Here they lodge; here they undergo their change, giving off alpha, beta, and gamma rays, and possibly radon. Unfortunately, the alpha rays are discharged where they can do most harm. They find close at hand the cells of the red bone marrow, the sourse of our red blood cells.

Is it safe to take radioactive water containing the small amount of radioactivity in the form of salts suggested as a possibility by the American Medical Association? This we do not absolutely know, but many persons (Flinn[1]) have grave doubts. This is based on the experience with painters of luminous watch dials. The paint[2] used has as its pigment zinc sulphide to which radium, or radium plus mesothorium, is added. About three milligrammes of radioactive salts are added to one hundred grammes of the sulphide. This is then made into a paint. The girls using the paint used to point their brushes by putting them in their mouths. It has been calculated that a girl might absorb some 15 microgrammes of radium a week. That is about 2 microgrammes a day. Possibly some workers got more, but the girls, as is well known, became diseased. The radium became deposited in their bones and was excreted extremely slowly. In some cases, even years after leaving work, the typical symptoms of radium poisoning occurred. One girl, for example, who was examined in 1925 and found quite healthy, has now crippling bone lesions and an anæmia from which she will probably not recover. The tremendous danger of intravenous administration of radium salts is so evident to experts in this field that it has but rarely been tried. The same is true of administration through the mouth. Cancer cells, arthritic lesions, etc., do not seem to take up radium more than any other tissue, indeed less remains in them than in the bones, and it is here that the ultimate damage is produced. There is as yet no proof that, taken for very short periods, such waters as contain radioactive salts do good. Further, our knowledge at present does not suggest that they can do good. We have, however, good evidence that if taken in large quantities they can do harm.

One of the radioactive waters extensively advertised contains, according to the highest analysis, 0.003 millimicrogrammes per litre. This means that sixty-seven million times the recommended dose of two teaspoonsful per diem would have to be taken to obtain the minimal dose which the American Medical Association would accept as having a possibility of activity. Indeed, even though it contains radioactive salts which may accumulate in the body, it seems that years would pass without an effective amount being taken.

Your Committee would, therefore, warn all physicians not to be misled by the claims made for radioactive waters, and would report that, in their opinion, the claims made for such waters are unfounded in fact. Physicians should not be participators in recommending their use to patients, thus leading them to spend valuable money on a supposed remedy which might better be spent on other methods of treatment.

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WOMEN IN MEDICINE*

BY ELEANOR PERCIVAL, M.D.

Montreal

Since time immemorial more or less heated arguments have arisen as to women's place in one or other field of activity—among these women's place in Medicine. However, if one reads the history of primitive peoples, ample proof is found that women have not only aided the advance of medical science, but that the practice of medicine by women is an old and well-established custom. It was practically only during the two hundred years from the middle of the seventeenth to the middle of the nineteenth centuries that women were debarred from educational and professional privileges in all the countries of Europe.

In the past many women have risen to prominence as scientific workers, and not a few have been accredited to universities of their day as brilliant medical graduates whose achievements have shed lustre on their time. Pliny mentions three women of ancient Greece who wrote on "The Diseases of Women", and Galen speaks of women physicians, one of whom, Antiochis, was signally honoured by having a statue erected in her honour by the city of Flos in Asia Minor, in appreciation of her medical ability.

The great Italian University of Salerno, so famous in the medical annals of the 10th to 13th centuries, is remarkable in that the department of gynæcology was entirely handed over to women physicians. The most distinguished women graduate of this school was Trotula, who in the 11th century published a book which was translated into several languages, the manuscripts of which are now in the National Library of Paris.

During the Middle Ages a woman occupied the Chair of Anatomy in Bologna for nineteen years. She invented the use of wax models for teaching purposes, and through this invention her name became known throughout Europe, and she received invitations to the Universities of Milan, St. Petersburg and London, but declined all these honours. One of her assistants, a young woman called Giliane, was the first to inject the blood vessels in anatomical specimens to preserve them.

In England, so long ago as the days of King Edgar, women were entitled by law to practise medicine, but, in 1421, urged by a petition from their male competitors, Henry V repealed this law, so we hear little of English medical women for a time. Nevertheless, exceptional women, like Anne Hackett, studied medicine and then practised among the poor. She was consulted by people coming even from the continent, and received special thanks from the king for her care of the wounded after the battle of Dunbar. In 1642, women, after passing three examinations, could be licensed as midwives. It is interesting to note that Queen Victoria was the first Queen to depart from the royal custom of employing midwives. Her reason for so doing was that chloroform, which had recently been introduced for the relief of pain, required a fully qualified doctor for its administration, and, as many women were objecting to its use on religious grounds, Victoria wished to lend the weight of her example in its favour.

Among Spanish medical celebrities may be mentioned the Countess of Chinchon, wife of the Viceroy of Peru, who in 1640 introduced the use of cinchona bark for the cure of patients suffering from malaria. In Switzerland Mdme. de Helden, wife of a celebrated surgeon, assisted, and later replaced, her husband in his work, though without a medical degree. She was the first to remove a piece of steel from the eye with a magnet, and she planned several other operations, the technique of which is still followed to-day.

Turning to America, the history of medical women began rather deplorably, for we read—"The first person to be executed in the colony of Massachusetts Bay was one Margaret Jones, a female physician, for witchcraft". During the 18th and early part of the 19th centuries medical conditions in the United States were in a poor way, and hence we hear little of medical women.

The whole idea of women's position in social life and their ability to take their place, independently of any question of sex, in the work of the world, was changed for the better during the 19th century. The admission of women to the medical profession was one of the earliest triumphs of this 19th century movement. Drs. Elizabeth and Emily Blackwell were pioneers among medical women of our time. After having been refused admission to numerous American medical schools, Miss Elizabeth Blackwell was allowed to enter the Geneva Medical College of New York in 1847. She graduated from it two years later and then returned to London and Paris for further study. Her's was the first woman's name to be placed on the medical register of the United Kingdom in 1859.

In England the struggle for admission to teaching schools was long and bitter. Miss Elizabeth Garrett after having been refused admission to every medical school in England, finally entered Middlesex Hospital as a nurse. By gentle persuasion she finally obtained permission to attend some medical lectures and to work in the dissecting-room. In one of the examinations she obtained highest honours, and

* An address delivered before the American Women's Club, Montreal.

as a result was forbidden to continue lectures. A similar fate befell another woman who had been granted permission to attend lectures at Edinburgh University. Here a scholarship was given to each of the first three students. As one of these happened to be a woman, it was given to the man immediately below her. Both of these events elicited much controversy, for public opinion was with the women. In 1874, the London School of Medicine for Women was opened and shortly after the Royal Free Hospital agreed to admit women students to its wards.

Prior to the great World War, this was the only school of medicine in London open to women; but during the war the policy of many of the other schools was modified. In 1918, clinical facilities were made available for women in seven of the London medical schools in addition to the London School of Medicine for Women; thus leaving only four schools confined entirely to men. Between 1914 and 1918, the opportunities for medical service both in England and France were greatly increased, and we find a sharp rise in the numbers of women medical students, all of whom rendered valuable service during the war. The work carried on among the soldiers, both in the Scottish Women's Hospital and in the Engell Street Hospital in London, won great praise and the status of women as physicians was greatly raised.

In spite of this added prestige and the ever increasing confidence of the public, women were again barred from these schools in 1920. At the present time only two London Schools offer facilities to women, namely, the London School of Medicine for Women, and the University College Hospital Medical School, which since 1925 has admitted twelve women a year to its classes. Many other schools offer pre-medical work to women, but will not admit them for clinical instruction. In March, 1928, a committee chosen by the University of London, and headed by Sir Wm. Beveridge, studied the whole situation carefully and reported that they were unable to see any valid argument against co-education in Medicine and suggested that there should be accommodations for 100 women as students, to be divided between the several schools.

This action on the part of the medical schools has greatly curtailed efficient work, for it is difficult for women medical graduates to obtain interneships, and later on staff appointments in England even to-day. The result has been a tendency for the women to organize schools and hospitals of their own.

In the United States and Canada, the road has been somewhat easier. In 1850 the Women's Medical College of Pennsylvania was founded and was the first college in the world for the medical education of women. By 1875 there were six hospitals in the United States staffed entirely by women physicians. By 1869 many of the western universities had opened their doors to women, but in the east progress was slower. Johns Hopkins admitted them in 1893, Cornell in 1899, Pennsylvania in 1915, Columbia in 1916, and McGill in 1918. To-day in the United States sixty-three Class A schools admit women as candidates for the medical degree, sixty-two of these being co-educational.

To-day most of the restrictions of the 17th, 18th and 19th centuries have passed, and one by one all the countries of Europe—England, Austria, Russia, France, Sweden and lastly Germany—have admitted women to their medical degrees at certain of their schools. As a result there are to-day 7,000 women practising medicine in the United States. In many places the step has been taken in very recent times, and it is too early to look for results. Although a Pasteur or a Banting has not arisen as yet among modern medical women, excepting possibly Madame Curie, the scientist of radium fame, still there are several whose work in research is recognized by all. I need only mention Dr. Florence Sabin, Professor of Histological Anatomy at Johns Hopkins; Dr. Maude Abbott of McGill (for her work on the heart); Dr. Lydia Rabinovitch Kempner, whose work on tuberculosis is world-famed; and Dr. Elsie Inglis who organized the Scottish Women's Hospitals.

The question of admitting women to medical societies, so important for their education and medical standing, and of offering them interneships and later staff appointments, was for a long time a very difficult matter. To-day, however, women are admitted to all the large medical societies in America without debate, and in limited numbers can obtain interneships on most of the large hospital staffs. In many hospitals they are not permitted to go on to the residency or senior interneship because it is feared that the men, who would be their juniors might object. This is perhaps the greatest handicap, for except in women's colleges very few women are permitted to attain to professorships or to fill any of the higher positions, even though scientifically they are eligible for the office.

Montreal has, perhaps, been more conservative than most cities of its size in this regard, for to date the Montreal General Hospital, although it has had four women who served as externes, has never had a woman resident physician, and at the Royal Victoria Hospital only two women have been in residency. As far as staff appointments have been concerned we have been exceptionally favoured, for every woman now actively practising in Montreal holds a staff position in either the Royal Victoria or the Montreal General Hospital and several have

teaching appointments at McGill as well. In Toronto, where some seventy-five women are actively engaged in medical practice, the medical alumnæ of the University of Toronto recently honoured the first Canadian woman graduate in medicine, Dr. Augusta Stowe Gullen, with a banquet at which her portrait was presented and accepted by the Academy of Medicine, and it now hangs on its walls.

Medicine, as a profession for women, holds more promise to-day than ever before. No longer does the holder of a medical degree find her work necessarily limited to service as a general practitioner, but she may find opportunity in a research laboratory, or in one of the various specialties, such as gynæcology, pædiatrics, or maternity work. Preventive medical work presents a great opportunity to-day. Administrative positions in the bureaus of child hygiene, in clinics for maternal welfare, or for the control of tuberculosis, are constantly calling for qualified women, and in no corner can a more definite contribution to human welfare be made. As a field of opportunity and effort for women, child welfare is to-day unique in that it offers non-discrimination as to sex in appointment and preferment for promotion. It is woman's field and woman's opportunity; few men are attracted to it. In Montreal, the Child Welfare Association and Children's Bureau are struggling ahead slowly but surely, but the support and coöperation of an organization such as yours will mean a great deal to their progress.

However, whether the goal be general practice or a specialty, preventive medicine or research, the woman who takes up medicine as a career must be prepared to devote her whole time and attention to her chosen work. It is not a career for the lazy, the selfish, or the weak, but a courageous, enthusiastic, physically strong woman will find great satisfaction in work which never loses interest and which is constantly promoting the welfare and happiness of humanity.

Men and Books

DOCTOR CLARKSON FREEMAN
1827-1895

A SKETCH

BY S. H. CORRIGAN, M.D., C.M., F.A.C.S.

Lampman, Sask.

During the last years of the eighteenth century, Governor Simcoe constructed two military roads out of York, Upper Canada—Yonge Street and Dundas Street. They were more or less passable, according to weather conditions. William Lyon MacKenzie, fleeing from Toronto in 1837, found Dundas Street a poor sort of road and was forced to make several detours. In the wake of his rebel feet came small feet of peace. They were to go on journeys highly significant, though less spectacular than MacKenzie's. On the same street at that time, Clarkson Freeman, aged ten, was trudging four miles to school at Palermo. Each afternoon he would cover the same four miles again, returning home to Munn's Corners. His parents had lived there since the troublous days of 1812, when, moving from New Jersey, they had become repatriated British citizens.

The boy had been born in 1827, the same year that marked the granting of a Royal Charter to King's College, later to become Toronto University. Clarkson Freeman wished to study medicine. To procure funds he taught school near Palermo, and, with his earnings, purchased sheep which he placed on shares among the farmers.

Graduating from the Toronto School of Medicine in 1853, he located for practice at Milton, Halton County, Ontario, where throughout his lifetime he exemplified the finer type of scholarly family physician.

There is a tendency to-day, even within our profession, to think of the earlier graduates of Canadian medical schools as having been ill-equipped in theory and practice. In previous volumes of our *Journal* have appeared sketches of these schools as they were in the pioneer days. On the faculties were men who were qualified to, and who really did, give instruction in not one but many subjects of the curriculum; men who mastered all that was taught of medicine in that day. They were giants and they developed giants among their students. It is said that the young man of to-day, who, after good preparation, proceeds through a course of classics, mathematics, science and philosophy to the Bachelor's Degree, and who then wins his way through a high grade college of medicine, is the most highly educated individual in the community. So it may be, but let him not boast; rather should he seek after and strive to attain some of the greater things of Heaven and Earth, yet undreamed of in our philosophy. Thus are created giants. Such giants were Clarkson Freeman and many rural physicians of his day and earlier.

Seventy-two years ago, Halton County was still pioneer land. It is my native county. Through the dim corridors of more than half a century, I see again the flat roads of sticky clay, the precipitous hills, the numerous creeks, which in a few hours could become raging torrents, the

cheap wooden bridges that often went out in the night, leaving dangerous traps where many a luckless horse and rider met with unhappy accident.

The country physician of that time commonly made his rounds on horseback. Doctor Freeman never lost his love for a saddle horse, nor was there ever a man who could ride with greater ease and dignity. I can see him now on his mud bespattered bay. He wore the tall hat of that day. Did not the heart of a boy grow warm and proud, receiving his kindly, gracious greeting on the lovely highways. Far and near, day and night, wherever the sick called, he responded. What of the storm or treacherous hillside. It might well have been him of whom Kipling wrote:

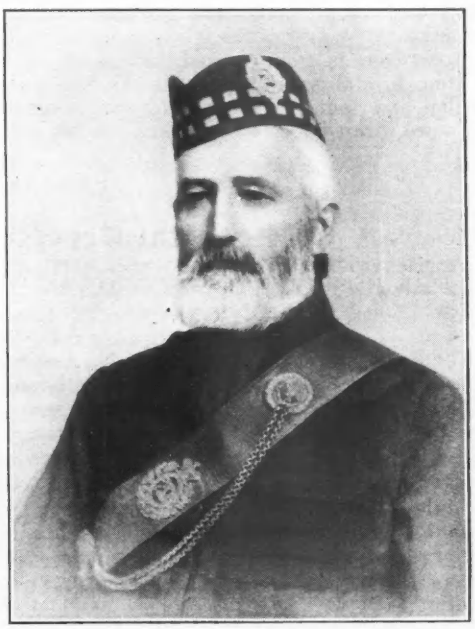
"Is the torrent in spate? He must ford it or swim.
Has the rain wrecked the road? He must climb by the cliff.
Does the tempest cry 'Halt'? What are tempests to him?
The service admits not a but nor an if."

If the day were pleasant and he rode in his buggy, he loved to stop at our little rural school and entertain us children by displays of intelligence on the part of his beautiful retriever. This dog was so trained that the doctor, on his rounds in the country, could despatch him with a written message to his office, where needed supplies were attached to the dog's collar and carried safely back to his master, even though the doctor had proceeded to a patient further along the road. If a boy went with a message to his office at his home (for that was before physicians had their offices down town), he was taken around the garden. It was full of flowers, every one of which the doctor knew botanically and loved. There were posies for all the children. How gallantly he plucked the choicest blooms for the women, young and old alike. Once I called for medicine for a sick neighbour. As he worked, he inquired for all the neighbours and asked many questions such as a boy loves to answer. The charm of his dispensary, the rows of bottles, the aroma of the galenicals, the tiny scale and its mystically inscribed weights, all won my heart, and he knew it.

There was his high power microscope; I must see in it the leg of a bluebottle fly—how wonderful! That was with the low power lens. Then he showed me two test tubes, one containing blood-stained urine. That was from a little child dying of scarlatinal nephritis. In the other tube was clear urine. The patient was dying of chronic Bright's Disease. Quickly he prepared two slides and I must see them. There were the corpuscles and the blood casts, nor have I ever seen them more clearly. And the other slide; there were the hyaline and granular casts and the epithelial cells.

Barefoot days passed. As a senior student in the college of medicine, I again saw the two microscopic pictures, but it was Clarkson Freeman who taught me to love the microscope. One wonders how many rural physicians of his time used the microscope as an aid in their daily work. He had a large library, not of medical books alone, but also of up-to-date volumes on allied and general scientific subjects. Having a great love for chemistry, he held, in his earlier years, open classes for those who cared to attend and join in his experimental studies.

Routine treatment did not satisfy him and he never ceased searching for better methods. One beautiful spring morning, when I was a little boy riding with my mother, we met him on the road and stopped to inquire for some children sick of diphtheria. He had spent the night at the stricken home. One child had died in the night and another was hopelessly ill. All the toil, anxiety and disappointment of the night was written on his kindly face. Even now I recall his remarks and feel sure he believed a



Clarkson Freeman

better day was at hand Koch had recently announced his identification of the bacillus of tuberculosis; all the world had heard of this.

Dr. Freeman told us that some one would find the cause of diphtheria and then children would not die so tragically. A year later Klebs described the specific bacillus. That was in 1883. In the last years of the same decade, Roux, Yersin and others knew much of the toxin. Behring's antitoxin was well proved by 1895, the year, also, in which my good friend, all too early, died.

In all general surgery of that day, he had been highly efficient. I must mention the incident

of the tailor, whose life was threatened by a foreign body in the larynx. Quick tracheotomy by Dr. Freeman saved his life. The rescued rascal, later, brought action in court against the doctor for having opened his trachea. The case came to trial at Hamilton and the court found in favour of the doctor.

During the American Civil War, Clarkson Freeman was a volunteer Medical Officer in the Federal Armies and, later, when the Fenians raided Canada, he volunteered for service. For many years he was Medical Officer of the 20th Battalion, Lorne Rifles. In the picture shown herewith, he wears their uniform. He was long surgeon for the Halton County jail and, as County Coroner, did good service in the cause of justice.

For post-graduate study he visited the leading clinics of Great Britain and Europe. As preceptor to many young students of medicine some of his best work was done. Some of his students still live and can testify to the happy days they spent under his guidance and instruction.

Apart from matters medical, he was Mayor of Milton several years. Through his executive ability and influence with municipal councils, the town secured good railway service at an early date. Largely through his foresight and wisdom an abundant supply of pure spring water flows from the mountain side to the town of Milton. His interest in the science of agriculture gave impetus to the county agricultural society and its annual exhibition, which to-day is one of the best in the Province.

Dr. Freeman married a daughter of Dr. James Cobban, of Aberdeen, sometime of Bermuda and later of Milton. Their home was a centre of hospitality, a place where people of culture loved to meet. Of their two sons, one survives; Dr. W. F. Freeman, long Surgeon for the Santa Fé Railway Company at their Los Angeles Hospital. The training the son received bespeaks the father's wisdom. Having graduated at Toronto, the son was sent on several journeys for cultural purposes and medical study. He won several of the higher medical degrees in Scotland.

In March, 1895, while still in active practice, Clarkson Freeman one night was disturbed by cardiac distress. His wife wanted to call one of his confrères, but he, who had long answered all night calls, entreated her not to disturb anyone at that hour. Such was the heart of him. In a few minutes his wearied body was resting in the last sleep.

Hospital Service Department Notes

THE HOSPITAL CONVENTION IN NOVA SCOTIA

The second meeting of the Hospital Association of Nova Scotia and Prince Edward Island, which was held in Sydney in June, was a decided success. When a new organization is born, it is seldom a difficult task to arouse charter enthusiasm, but the second year tells the tale. In this instance the delegates to the second conference, despite the distance to be traversed and the heat, were more numerous and enthusiastic than even at the previous meeting in New Glasgow. The new association has become firmly rooted.

A program representing a wide range of hospital subjects was given by administrators, trustees, superintendents of nurses, and medical men. The large attendance of doctors and their active participation in the program and in the discussions bore evidence of the increasing interest which they are taking in the general problems of their hospitals. Outside speakers, who assisted in the program and in the Round Table, were Drs. M. T. MacEachern and H. L. Scammell, of the American College of Surgeons, and the Secretary of this Department.

A strong denunciation of the public health situation in Nova Scotia was made by Mrs. P. M. Fielding, the editress of the *Windsor Tribune*, who urged that the various health activities of the provincial government, now divided up among several ministerial departments, be concentrated under one department and placed under the direction of a fully qualified expert. The increasing development of the hospital as an educational health and social centre for the community was another subject given considerable attention in several papers.

Nursing education and the conducting of training schools is always of interest to administrators and to staff-doctors. A novel feature, very timely in view of the survey being conducted just now, was a debate between two teams of young graduate nurses on the subject:—

"Resolved, that the small hospital could be operated more efficiently and less expensively without an attached school of nursing."

The teams were chosen from St. Martha's Hospital, Antigonish, and St. Joseph's Hospital, Glace Bay. It was soon obvious that the four young ladies had been carefully selected for their oratorical qualifications and had given considerable time and thought both to the data relevant to the subject and to the fine art of debate, of presentation and rebuttal. The sub-

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

ject was of great interest to the many representatives of the smaller hospitals in attendance and the facts pro and con, presented in this unique manner, made a more lasting impression upon the large audience than might otherwise have been the case.

A banquet at the Isle Royale Hotel, attended by over one hundred guests, and with an excellent toast list, was the feature of the social program. Drives and teas at the various hospitals in the Sydney district were also included in the entertainment.

Among the resolutions passed were ones thanking the Honourable, the Minister of Finance, and the Department of Hospital Service of the Canadian Medical Association for the recent favourable revision of the customs regulations affecting certain hospital equipment and supplies.

The following officers were selected for the ensuing year: *Honourary Presidents,* Major W. A. Fillmore, Amherst, and Mayor James McConnell of Sydney; *President,* L. D. Currie, of Glace Bay; *Vice-presidents,* Rev. C. H. Wright, of Inverness, and Sister Rita, Superintendent of St. Joseph's Hospital, Glace Bay; *Sec-Treasurer,* Miss Ann Slattery, R.N., Halifax.

THE MARITIME CONFERENCE OF THE CATHOLIC HOSPITAL ASSOCIATION

The seventh annual meeting of the conference of the Catholic hospitals in the Maritime provinces was held in Sydney in June, immediately following the two-day meeting of the Hospital Association of Nova Scotia and Prince Edward Island. Sixty or more delegates were in attendance, many of whom were present for the entire four days of the two conventions.

The Sisters' hospitals in the eastern provinces have taken a keen interest in the progress of nursing education and one infers from the discussion of this subject during the first morning of the conference that it may soon be feasible to institute an advanced course in nursing in conjunction with St. Francis Xavier University at Antigonish, N.S., a course which if arranged would possibly lead to an Arts degree and a nurse's diploma. Such a course would be of material assistance to administrators and to instructresses, to whom the broader education would prove invaluable in their executive and pedagogical work.

Another subject which was given considerable thought dealt with the noticeable trend of today for hospitals to assume the social service duties in their respective communities. The work of the hospitals in salvaging human bodies is so frequently nullified because of the lack of subsequent supervision that some follow-up system is most important. In larger cities a number of the hospitals maintain their own social service corps. This work is now being developed by some of the Maritime hospitals, an outstanding example of this valuable work being that of St. Joseph's Hospital at Glace Bay. In most communities existing health organizations do not realize their obligation to supplement their preventative work with social service which will keep the citizens healthy after they have received treatment for the acute phases of their illness. The necessity which compels the hospitals to direct this work now places the expense upon the private patient and, therefore, concomitant with the development of the hospital as the health centre of the community should go an educational campaign to so increase municipal and provincial subsidy that the financial burden of these expansions will fall upon the healthy rather than upon the sick.

It was particularly pleasing to see so many medical men in attendance at these sessions and to note their many contributions to the discussions. The president of the Cape Breton Medical Society, Dr. J. B. Lynch, in particular gave freely of his time to the work of the convention. Two Round-Table discussions were held, one being conducted by Dr. M. T. MacEachern and, the other by Dr. G. H. Agnew. Many questions concerning doctors' obligations and privileges were discussed during these periods. A well conducted demonstration by Sister Annunciata, on how to teach anatomy, illustrated with blackboard diagrams, and the dissection of a beef heart was a distinct surprise and an object lesson to the doctors present.

The efficiency with which a county can be organized to support a hospital was illustrated by the report of the work done by the Ladies' Aid Committee at St. Martha's Hospital, Antigonish. The auxiliary work done here under the guidance of Sister M. Anthony, R.N., is probably the most extensive in Canada, as no less than eighty branches, embracing all denominations, are actively organized and supporting various activities of this hospital.

This association has set an excellent example to the other hospital associations in the work of the committees during the year. The reports on nurses' education, laboratory development, and pharmacies are valuable contributions to hospital data. One recommendation, that all roentgenological and pathological laboratory technicians be required to have a minimum of preliminary education and of technical training, is well taken, and should bear further consideration by other associations. This subject will be dealt with more fully at another time.

Much credit is due to Sister Mary Sacred Heart, R.N., of Inverness, the President, and to Sister John Baptist, Antigonish, the Secretary, for the success of this annual meeting.

THE NEW PAVILION AT THE TORONTO GENERAL HOSPITAL

One of the finest, if not the finest, of private pavilions in Canada has been added this summer to the Toronto General Hospital. This new building, with three hundred and thirty-six beds in three hundred and twenty rooms, embodies many of the latest developments in hospital construction and equipment and is one of which this hospital may well be proud. It has been designed to replace the former private pavilion which will be utilized for other purposes. This now brings the total capacity of the Toronto General Hospital to more than one thousand beds.

The new building is located on University Avenue, is "T" shaped, nine stories in height, and is in architectural conformity with the other buildings of the group. The cost of this particular unit, which is one of several important additions to the hospital, was approximately two millions of dollars. An innovation in keeping with the modern tendency is the reservation of a considerable portion of the main floor as guests' accommodation for friends of patients. This hotel accommodation is completed by the provision of a special dining room for such guests, attractively located on the south side of the building. As a matter of fact, the spacious rotunda and lobby finished in walnut and with rich red tapestry hangings and florist shop, is much more suggestive of a hotel entrance than that of a hospital.

The operating rooms are located on the ninth floor. There are ten surgical rooms and five additional operating rooms reserved for obstetrical cases. The walls are finished with a French grey imported tile. Natural illumination, supplemented by artificial lighting, is utilized. The equipment is very complete, including a thermostatically controlled saline heater and piping from a central store room for anæsthetic gas. The five delivery-rooms are furnished as complete operating-rooms and the walls are insulated with four inches of cork. The spacious nursery is quite modern in lay-out and includes a roomy nursery for premature infants and a self-contained isolation unit. Two floors are to be devoted to maternity cases.

With the exception of the operating room service and the nursery, the new pavilion will not be staffed by pupil nurses. A graduate nursing service, supplemented by ward aides and maids, will be provided. Food service will be of the direct type, and elaborate equipment, including food subveyors, refrigerated parking space for food-trucks containing the "cold set-up," excellent dish washing equipment, etc., has been installed.

A unique arrangement will be utilized in the nurses' signal system. There will be no flashing lights at the patients' doors. All messages from the patients will be transmitted by telephone or signal to the central switchboard and this message will be relayed by telautograph or telephone to the floor clerk or nurse on each floor. It is hoped that the transmission by telautograph will avoid misunderstanding and that the transmission of the patients' requests by telephone will permit a saving of a portion of the nurses' footsteps. Although several difficulties come to mind in connection with such a system, the hospital administrators have given it a thorough experimental trial on certain floors of the former private pavilion and are confident that the system will prove more economical as well as more efficient.

A large number of the rooms are being assigned rates which are very moderate indeed, and if sufficient nursing service can be provided to minimize the employment of special nurses, there should be a considerable reduction in the cost of hospitalization to the patients fortunate enough to be sent there.

This new pavilion compares most favourably with the latest units in either America or Europe and the governors of the hospital, the superintendent, and the architects are to be congratulated upon the completion of this beautiful new unit.

EXTENSIVE DEVELOPMENTS IN RADIUM THERAPY AT THE TORONTO GENERAL HOSPITAL

According to a recent announcement, the trustees of the Toronto General Hospital have completed plans for the establishment of a radiological-therapeutic institute for the study of the effect of radium, x-rays, and allied agents in the treatment of disease.

At the present time, the hospital has approximately one-half gram of radium, and to this will be added one additional gram, at a cost of approximately $70,000. Associated with the recent opening of the new private pavilion and with the opening of the new pathological building, the Banting Institute, which will be opened in the late summer, a considerable rearrangement of the various departments will be effected, and it is proposed to give this new "Institute of Radiotherapy" considerably more space than that now enjoyed by the radiological department. It is estimated that the total cost of the equipment and other facilities for this new development will represent an investment of nearly $150,000.

A feature of considerable interest is the decision to incorporate an emanation plant in this new institute. Five hundred milligrams of

radium will be set aside for this work, and emanations will then be available for distribution to any reasonable distance.

It has been announced that the staff of the institute will consist of a director, a consulting staff, and an active staff. All the activities of the institute will be controlled by an administrative body which will include in its membership official representatives of the various departments and specialties of medicine.

This announcement is of considerable interest to the medical profession, as an association of such extensive therapeutic facilities with the scientific and the research facilities of the university should increase considerably our knowledge of the treatment of malignancy and other diseases, and should further our knowledge of the pure physics of radium and roentgen rays and of their effects on healthy and diseased tissue.

Medical Societies

THE NEWFOUNDLAND MEDICAL ASSOCIATION

The annual Convention of the Newfoundland Medical Association was held at St. John's, July 8th to 12th, under the presidency of Dr. R. Jardine Freebairn, of Ferryland. The President's address was of more than usual interest, dealing with his forty years of practice in Newfoundland "Outports", among fishermen, miners and farmers, and many interesting cases were recited.

Two delegates from the Canadian Medical Association attended the meetings, and read papers. Dr. Harris McPhedran spoke on "Heart disease in general practice" and on "Tuberculous pleurisy," while Dr. Foulds read papers on "Renal calculus" and on "Prostatic hypertrophy." The papers were of great interest to all present, and elicited much discussion, the lecturers having to answer many questions. In addition to the papers read, bedside clinics were conducted and were highly appreciated.

At the business meeting, Dr. Cochrane, of Corner Brook, extended an invitation to the Association to hold its Convention next year at Corner Brook, and the invitation was accepted.

The election of officers resulted as follows:—
President, Dr. F. Fisher, Corner Brook;
1st Vice-President, Dr. L. Paterson, St. John's;
2nd Vice-President, Dr. S. G. Kean, Brookfield;
Secretary-Treasurer, Dr. John Grieve, St.John's.

N. S. FRASER.

THE BORDER MEDICAL SOCIETY

A new medical society, the Border Medical Society, has just been inaugurated, to embrace the neighbouring parts of North Dakota, Saskatchewan and Manitoba. The object of the organization is the promotion of friendly intercourse among medical men and their wives and the advance of medical service by the interchange of ideas, scientific, clinical, and of medical policy.

The present officers are:—*President*, the Hon. R. S. Thornton, M.B., C.M., of Deloraine, Man.; *Vice-President*, A. R. McKay, M.D., of Bottineau, N.D.; *Secretary-Treasurer*, Noel R Rawson, M.B., B.S. NOEL R. RAWSON.

THE SIGNIFICANCE OF ESSENTIAL HYPERTENSION IN YOUNG MALE ADULTS.—R. S. Palmer (*J. Am. M. Ass.*, 694, March 8, 1930), tabulates the results of examination of 3,598 men whose average age was under 20. Examinations were made between 1914 and 1918, and a large number of cases have been followed for a ten-year period. Of the total number slightly more than 10 per cent had a systolic blood pressure of 140 mm. Hg. and upwards, while 2.25 per cent had one of 150 mm. and upwards, without urinary or other abnormalities; the systolic pressure in all these cases was more than 10 per cent above the average, taking age, height, and weight into consideration. Half of these individuals had diastolic pressures more than 10 per cent above the calculated normal; in a normal control group only one-quarter showed a similar diastolic abnormality. It was noted that of the "normal" controls 2.13 per cent were of a "neurotic" type, whereas of those with systolic pressures of 140-150 mm. 8.3 per cent were of this type, and of those with systolic pressures of 150 and over 16 per cent. No correlation was found with a previous history of infectious disease; this contrasts with Barach's finding of a correlation with previous typhoid fever and diphtheria. There was a slight increase of the proportion of "overweight" persons in the hypertensive group, with an increase in the proportion of "underweight" persons also among those with systolic pressures over 150 mm. Of 115 persons followed up for ten years, 66 were normal controls and 49 hypertensives; of the former 4.5 per cent had systolic pressures of 140 mm. or over, and one patient of 150 mm.; of the latter 12.2 per cent had systolic pressures of 140-150 and 10.2 per cent of 150 or over, the highest being 180. The main conclusion drawn from the research is that if hypertension is present at the age of 20, it is more likely to persist than it is to arise *de novo* in a normal subject. Vasomotor symptoms, such as palpitations and flushings, were observed during the ten-year period in a quarter of the hypertensive subjects, as compared with only one-seventh of the controls; in both groups the incidence of familial cardiovascular disease was approximately the same.—*Brit. M. J.* Aug. 9, 1930.

University Notes

Dalhousie University

The equipment of the Dental School at Dalhousie University has been very recently augmented by the gift of a new model Heidbruick gas and oxygen machine of the latest pattern, presented by Mr. Charles Bell and his son Mr. E. A. Bell.

The installation of this apparatus will facilitate instruction in the best methods of gas and oxygen administration and will be of the greatest value to students in the school. Not only is this gift heartily appreciated by both professors and students for the useful purpose which it will serve, but also for the spirit which prompted its presentation.

University of Edinburgh

The new department of animal genetics of the University of Edinburgh was opened on June 30th by Sir Edward Sharpey-Schafer, F.R.S., under the presidency of Principal Sir Thomas Holland. Sir Edward Sharpey-Schafer, before declaring the buildings open, gave an address. Professor F. A. E. Crew, in presenting Sir Edward with a key to perform the opening ceremony referred to the important work of Professor Cossar Ewart, who, he said, was fortunately present that day. Professor Ewart might well regard this department as his own creation and the realization of his dream.

The ceremony also included the conferment of the honorary degree of LL.D. upon Mr. Thomas Bassett Macaulay, president of the Sun Life Assurance Company of Canada, who had made a series of gifts to the department. In presenting him the dean of the faculty of law mentioned that, like Lord Macaulay, the present recipient of the degree was descended from the Macaulays of Uig in the island of Lewis. His father had emigrated to Canada, where their guest had built up one of the foremost insurance corporations in the world.

After the degree had been conferred Mr. Macaulay said that the study of endocrinology had been one of his hobbies for at least twenty-five years. This might seem a strange recreation for a layman, but his object had not been the acquisition of knowledge of merely theoretical value. Medical science had made marvellous progress during the last two generations in combating disease, chiefly in improved sanitation and in the knowledge of the nature of infection, but he thought that most of the great problems of non-infectious degenerative diseases of the latter third of life still remained unsolved. Great advances he felt reasonably certain would be made in the understanding of the endocrine glands during the next twenty-five years. He had been deeply interested in the splendid work that was being done in the animal genetics department of Edinburgh University, and he was pleased that the biochemical department of McGill University, Montreal, was now actively co-operating with Edinburgh. He congratulated the University Edinburgh on the part it was taking in the great work of the future. At a luncheon which followed the ceremony in the Library Hall of the Old University, Sir Thomas Holland mentioned that during the past two years Mr. Macaulay had given to the genetics department of the university contributions which amounted in all to £67,000; the university, he said, would endeavour to justify the confidence he had shown in its work.

The new buildings of the animal breeding research department of Edinburgh University are situated at West Mains Road. The original idea of this department, conceived before the war, formed part of the plans of the development commissioners. After the war the plans were reconsidered, but shortage of money prevented development of the work on a large scale. In 1920 Dr. F. A. E. Crew, who was an assistant in the zoology department of the university, was asked by Sir Edward Sharpey-Schafer, then chairman of the joint committee, to take charge of the embryo department, and a few rooms in the Old Infirmary buildings were devoted to its work. Here some sound scientific work was done. Studies on wool began in 1923, and studies on pigs in 1927, other subjects of agricultural importance being taken up later. In 1928, as the result of a gift of £30,000 from the International Education Board and of £10,000 from Lord Woolavington, the department was reorganized, and Dr. Crew was appointed to the newly founded Chair of Animal Genetics. The buildings which have just been opened were then started. Their purpose is to provide facilities for work of a purely scientific nature which is expected to have an important effect upon agriculture in about fifteen or twenty years' time. At present inquiries are being undertaken into the inheritance of milk yields in cows, and into the ideal type of bacon-yielding pig.—*Brit. M. J.* **2**: 75, 1930.

The summer graduation in arts and sciences was held on July 3rd in the McEwan Hall, Edinburgh. Principal Sir Thomas Holland pre-

sided, and conferred about five hundred ordinary degrees. Along with these the honorary degree of Doctor of Laws was conferred upon Sir Thomas Barlow, Bt., Physician Extraordinary to the King; Mr. Max Beerbohm; Sir Otto Beit, founder of the medical and scientific research fellowships which bear his family name; Professor Baldwin Brown; Sir Andrew Grierson; Sir William B. Hardy, F.R.S., Director of Food Investigation; M. Jean Jusserand; Dr. Abbot Lawrence Lowell; Emeritus Professor Otto Schlapp; Sir David Wallace, Consulting Surgeon to the Royal Infirmary of Edinburgh; Professor W. W. Watts; and Dr. K. F. Wenckebach, Emeritus Professor of Medicine, University of Vienna.

University of Oxford

At the Encaenia held on June 25th the honorary degree of D.Sc. was conferred on Sir Arthur Keith, M.D., F.R.S., Conservator of the Museum of the Royal College of Surgeons of England.

The Osler Memorial Medal for 1930 has been awarded to Sir Wilmot P. Herringham, K.C.M.G., C.B., D.M., F.R.C.P. This bronze medal is awarded every five years to the Oxford medical graduate who has, in the opinion of the Board of Awarders, made the most valuable contribution to the science, art, or literature of medicine, and who has not previously received the medal.

Toronto University

The formal opening of the Banting Institute of the Faculty of Medicine, University of Toronto, will be held on Tuesday, September 16, 1930. This building provides laboratory, teaching and research facilities for the Banting and Best Department of Medical Research, the departments of Pathology and Bacteriology, Pathological Chemistry, Medicine, Surgery, Obstetrics and Gynæcology, and the other clinical branches. It has been arranged that Lord Moynihan of Leeds will open the building. The university will confer honorary degrees upon a number of the distinguished guests in honour of the occasion.

An interesting feature of the program will be the unveiling of a portrait of the late Lord Lister by E. Wylie Greer, which has been presented to the university by two of his former Canadian house-surgeons, the late Dr. F. LeM. Grasett and Dr. E. St.G. Baldwin. The portrait is to be hung in the library of the new building, where a brick from Lister's Ward of the Glasgow Infirmary is to be incorporated in the mantel piece. A suitably engraved tablet is to be placed beneath these memorials to the famous surgeon.

Special Correspondence

The London Letter

(From our own correspondent)

The season of annual conferences is just drawing to a close and the representative meeting of the British Medical Association heads the list for having got through an immense amount of very important and controversial business with a minimum of lay press publicity. To the outside observer who knows nothing of the internal secret workings of the British Medical Association machine the most interesting features of the meeting were the discussions on unqualified practice, on including dependents in the National Health Insurance scheme, and on the "general medical services," details of which have already been discussed in these notes. With regard to unqualified practice it is to be regretted that the profession continues to acquiesce in the present system, for although it is stated that legislation is impracticable it is not doing the profession any good so long as the public regards such apathy as acceptance of all the quacks claim.

On the inclusion of the dependents of insured persons under the national health insurance scheme there was an amazing degree of unanimity, and a resolution calling for this step was easily passed with the provision, in an amendment, for adequate safeguards regarding remuneration and conditions of service.

The full reports on the discussion of the scheme for a general medical service for the nation are not available as these notes are being compiled, but there is sufficient known to indicate that the Council brought forward its proposals without any interference from the Ministry of Health, that the proposals were not to be taken as final, but merely as a contribution to the discussion which is proceeding up and down the country, and finally that the proposals were accepted by the whole meeting with only a handful of dissentients. The position of the medical officer of health in the scheme was the subject of much debate, and, reading between the lines of the report of another annual congress, that of the Royal Sanitary Institute at Margate, it is obvious that the changes in local government resultant upon recent legislation are going to alter considerably the relative importance of the public as against the private medical man in the future. At Margate over 1,600 delegates were regaled with some 60 papers and addresses and the keynote of preventive medicine appeared as the *leit motif* throughout the proceedings. The title "educa-

tion of health personnel" has scarcely an English ring, so that it was not surprising to find one speaker urging the adoption over here of the slogan from New York, "Go to your doctor before he has to come to you." Maternal mortality was down as one of the important subjects to be discussed but in the reports there seems to have been more of a debate on criminal abortion.

A third important annual conference, the Royal Medico-Psychological Association, met at Oxford and among many valuable communications was one by Professor G. M. Robertson pleading for an extension of out-patient mental diseases clinics. As a subsequent speaker pointed out, there are something like 3,000,000 cases of mental disorder in this country, and the only way to reduce such a large total appears to be to get hold of patients in the very earliest stages of their trouble, and this is best done by a department for the purpose at a general hospital.

The British Waterworks Association has also been meeting recently and while the hydraulic side of the discussions does not concern the medical profession the bacteriological control of water supply is of some interest and importance. Prof. J. M. Beattie, of Liverpool (where the meeting was held), discussed the value and methods of routine examination. He illustrated his thesis by quoting the case of a city where an increase of paratyphoid fever suddenly occurred. Routine examination of the water indicated a raised *bacillus coli* content and further investigation incriminated the water supply as the probable source of the paratyphoid infection.

The subject of water pollution has been in the air to a certain extent recently, following upon the publication of an official report by a Government Advisory Committee. This was mostly concerned with the polluting of rivers by trade effluents, and it is recommended that the local sanitary authority must everywhere accept responsibility for the disposal of trade effluents, just as it does for domestic sewage. Whether this will restore the fishing to certain rivers where beet sugar factories have destroyed it remains to be seen, but it is an interesting comment on this nation that more fuss is made in the press over the piscatorial side of the question than that concerning the public health.

This apathy to the effects of trade waste products on health is always present where the atmosphere is concerned, and the latest report on atmospheric pollution makes sorry reading. The deposition of sulphates and tar from the air in London has increased when compared with the preceding five years average and since officialdom does not appear to worry about the effect of this on the nation's health it may be that a new research on the injury caused to buildings by sulphur compounds may produce better results. The ill children of our cities can be taken to artificial sunlight clinics in suitable cellars, but fortunately buildings are not so easily repaired.

ALAN MONCRIEFF.

London, August, 1930.

The Edinburgh Letter

(From our own correspondent)

The new Department of Animal Genetics on the King's Building site of Edinburgh University was opened on June 30th by Sir Edward Sharpey-Schafer, F.R.S. Mr. T. B. Macaulay, President of the Sun Life Assurance Company of Canada, has given generously to the funds for the institution of this department. The Senatus of the University took the opportunity of the ceremony to confer upon Mr. Macaulay the honorary degree of LL.D. A key of the Department was presented to Professor Sharpey-Schafer by Dr. F. A. E. Crew, the first occupant of the newly founded Chair in Animal Genetics. The ceremony at King's Buildings was followed by a luncheon in the Upper Library of the Old University at which Principal Sir Thomas Holland presided. The Principal drew attention to the fact that during the last two years Dr. Macaulay's gifts to the University amounted to £67,000. It should not be forgotten that the island of Lewis and the town of Fraserburgh have also benefited by the munificence of this youngest honorary graduate of Edinburgh University.

The University of Aberdeen has also conferred its Doctorate of Laws on Mr. T. B. Macaulay. Among other benefactions he has given the Soil Research Institution to the northeast of Scotland, a gift of great value to that essentially agricultural part of the country.

The first annual report of the Edinburgh Hospital for Crippled Children has been presented. This is the new orthopœdic hospital, with its site at Fairmilehead in the South of Edinburgh, which forms the central part of a scheme with various major and minor clinics scattered through the south-eastern area of Scotland. The building of the hospital block is now well advanced, and work on the administrative block and nurses' home has been begun. The hospital is to be opened with three wards of 25 beds each, but the plans have been prepared to allow of an additional three wards of the same capacity. It is not anticipated that the building will be completed before the Spring of 1932. Mr. W. A. Cochrane, F.R.C.S. has been appointed surgeon to the hospital and also University Lecturer in Orthopædics.

Edinburgh University Court has decided to institute a diploma in tropical veterinary medicine. The course for this diploma will occupy six months and will commence this year. It will be held partly at the University and partly at the Royal (Dick) Veterinary College. The curriculum will include classes in parasitology and entomology, bacteriology, meat and milk production, feeding of animals, breeding of animals, epizootology, and a number of special lectures and demonstrations in subjects of special interest to tropical veterinary surgeons. This is the first occasion on which such a course has been held in Britain.

The latest addition to the Dundee Royal Infirmary has just been finished. It consists of a new maternity department, and is an important addition to the public health services of the city. It is a little over thirty years since Sir James Caird presented the city of Dundee with the maternity hospital which is now to give place to this larger and more modern hospital. The hospital is a ferro-concrete building of three stories, and has departments for the care of in-patients and ante-natal patients, a district room and inquiry office, a students' room, and a lecture theatre suite. Two wards, each with twelve beds, have been designed to admit the maximum amount of sunlight. A cot hangs at the foot of each bed, and a wireless installation will enable patients to listen-in. There are also smaller wards fitted with French windows and containing two beds. Separate accommodation is provided for the delivery and after-care of potentially septic patients, and rooms are set apart for babies, for those prematurely born, for women in the first stage of labour, and for patients suffering from eclampsia. At the opening ceremony Dr. Haig Ferguson, President of the Royal College of Surgeons and Dr. Parlane Kinloch, Chief Medical Officer of the Department of Health for Scotland, were present. It was pointed out that during the last year the voluntary hospitals in Scotland received for treatment 110,000 in-patients and 360,000 out-patients.

Sir Leslie Mackenzie, LL.D., formerly medical member of the Scottish Board of Health, has been invited by the Executive of the Geographical Association to occupy the presidential chair of the Association in 1931. Sir Leslie Mackenzie's report on Scottish Mothers and Children to the Carnegie United Kingdom Trustees appeared in 1917. It has continued to attract attention since then and has been widely circulated in America. Recently Sir Leslie visited Kentucky. There he inaugurated a hospital service in the mountainous districts of the Alleghany region, modelled on a plan similar to the services in the Highlands and Islands of Scotland, for the conception of which he was so largely responsible. Sir Leslie has also furnished information to the Government of Newfoundland and other authorities about this important scheme. The Council of the Association of Geographical Teachers in London, has also asked him to become President of the Association in 1931.

The Victoria Jubilee Cullen Prize of the Royal College of Physicians has been equally awarded between Dr. G. M. Robertson, Physician Superintendent of the Royal Mental Hospital, Edinburgh, and Sir Andrew Balfour, K.C.M.G., Director of the London School of Hygiene and Tropical Medicine. Sir Andrew Balfour is a graduate of Edinburgh University and formerly played rugby football in Scotland's international team. He is also the author of several historical novels, some of which are descriptive of the early medical school in Edinburgh.

The Dr. Alexander Black Lecture at the Royal College of Physicians was delivered by Dr. David Rorie, D.S.O., on June 20th. Dr. Rorie lectured on "Folk Medicine in Scottish Ballad Literature." This is a subject into which he has delved deeply and his selections from the ballads with which he delighted his audience betokened a wide knowledge. As might be expected his discourse, which was of great historic and medical interest, was enlivened with light and happy touches of humour. Dr. Rorie is himself a poet and a writer of songs. He is co-editor of the *Caledonian Medical Journal*, and his articles on Scottish Folk Medicine have aroused a widespread interest. During the War he commanded a Field Ambulance and later became A.D.M.S. of the 51st (Highland) Division.

Dr. D. K. Henderson, F.R.F.P. and S., Physician-Superintendent of Glasgow Royal Mental Hospital, has been appointed Morison Lecturer at the Royal College of Physicians for the year 1931.

A party of American Surgeons, Members of the Society of Clinical Surgery and the Interurban Surgical Society visited Edinburgh on the 14th, 15th and 16th of July. The party included Dr. Balfour of the Mayo Clinic; Drs. Darrach, Whipple and Mathews, New York; Dr. Harvey, Newhaven; Drs. Lee, Muller and Pfeiffer, Philadelphia; Drs. Lund, Mixter and Richardson, of Boston; Dr. David, Chicago; Dr. Rixford, San Francisco; Dr. Stone, Baltimore; and Dr. Scrimger, Montreal.

Operative clinics were held daily in the Royal Infirmary and in the afternoons a series of demonstrations was given in the Surgical Department of the University. On the last evening a dinner was held in the Royal College of Physicians, with Sir Harold Stiles in the Chair.

GEORGE GIBSON.

23 Cluny Terrace, Edinburgh.

PROPHYLAXIS OF RICKETS.—A. G. De Sanctis and J. D. Craig (*J. Am. M. Ass.* 1285, April 26, 1930) made comparative observations on the value of viosterol (irradiated ergosterol) and cod-liver oil as prophylactic antirachitic agents with the following results. Cod-liver oil in doses of three teaspoonfuls daily prevented rickets in 97 out of 103 infants studied. On the other hand, viosterol D in doses of 10 drops daily prevented rickets in only 77 per cent out of 123 cases. Viosterol, therefore, is less effective in the prevention of rickets than cod-liver oil, although the infants on viosterol received twice as many rat-units of vitamin D as those on cod-liver oil. The authors think that one of two conclusions may consequently be drawn: either the present recommended dose of viosterol is too small to prevent rickets, or, as seems more likely to them, rickets is not due to a deficiency of vitamin D alone.—*Brit. M. J.*, Aug. 2, 1930.

Letters to the Editor

DRUG ADDICTION IN CANADA

To the Editor:

I have seen during the last few months, under the heading of "Letters to the Editor" various comments made by physicians on narcotic addiction in Canada. I, myself, being a registered druggist, am thinking that the druggist is equally concerned, he being the man who handles and dispenses the various narcotics. I take the liberty of quoting an article which appeared in the *Canadian Pharmaceutical Journal*, February 15th, 1930, page 463, under the title "The Treatment of Insomnia" which I think expresses very well the druggist's view point on this subject.

> "Addiction is an extremely rare sequel to the prescribing of ordinary sedative drugs; the addict is usually a person from whom drugs have been withheld until he has reached a state of terror. It is to avoid a reception of this terrifying experience that he clings to his drug. The term "addiction" is certainly not to be applied to a person who takes a sedative every night under medical advice, and thus preserves sleep, good health, and full mental activity. "Sleeping draught" is another term used incorrectly; properly it can be applied only to amylene hydrate and paraldehyde, which produce sleep whenever they are given. If given in the daytime the barbitone group cause no desire for sleep. Further research may show that their action is to strengthen a weakened inhibition, so that sleep is only a secondary effect. Patients who exhibit exhaustion with defective sleep, due either to advancing years or prolonged over-stimulation of the nervous system, may have their mental stability strengthened, so that mental activity remains on a high level for many years by taking a small dose of dial or medinal every night. There is no evidence of any deleterious effect. Sedatives should be given over long periods, and there is never any difficulty in withdrawing them when required. *If medical men would prescribe effective remedies for insomnia, there would be less taking of drugs by patients on their own initiative.*"

HOWARD S. TAYLOR.

Montreal, June 30th, 1930.

Topics of Current Interest

An Experiment with B C G

The remote country district of Trysil in Norway has been chosen for an interesting mass experiment. Since August, 1927, it has been visited by five successive expeditions of doctors and medical students who, up to August, 1929, had carried out Pirquet tests in 2,427 healthy persons, 1,079 of whom were Pirquet-negative, and were inoculated with B C G tuberculosis vaccine once or oftener. In an account of this work by Dr. O. Scheel, Dr. R. Schultz-Haudt, and Dr. T. Skaar in *Norsk Magazine for Laegevidenskaben* for March, a résumé is given of their findings. The technique of the inoculations with B C G was not uniform; in 1927 and in August, 1928, it was injected into the subcutaneous tissues in doses of 0.05 or 0.025 mg. This technique rarely gave rise to abscesses. In November, 1928, the B C G was deposited in the deepest part of the cutis, the point of the needle passing from the subcutaneous tissues upwards to the deeper structures of the skin. The dose was 0.025 mg. and the incidence of abscesses was high (38 per cent). In August, 1929, the dosage was reduced to 0.02 mg. and the vaccine was deposited just under, or in the deepest layers of, the cutis. Infiltration of the skin at the site of inoculation occurred sometimes directly or a few days after it, but more frequently from six weeks to three months after it. These infiltrations, up to the size of a pea, lasted for weeks and even months, but within a year they had either disappeared completely or had left a small scar or a bluish discoloration. They often ended in abscess formation, the pus being evacuated from one to three months after the inoculation. Spontaneous evacuation could be avoided by aspiration, repeated if necessary. The more superficial the level at which the B C G was deposited in the tissues, the greater was the proportion of the positive Pirquet reactions after the inoculation. Thus, when the B C G was administered by subcutaneous injection, the Pirquet test became positive only in 31 per cent, whereas it did so in 81 per cent of the persons given the vaccine by cutaneous inoculation. The same was true of the two other sequels of the B C G inoculation—infiltration and abscess formation—which became more frequent as the level at which the vaccine was deposited approached the surface of the body. It is not yet clear whether these three sequels to B C G inoculation can be correlated with a comparatively high degree of immunity; the subsequent fate of the persons in Trysil given subcutaneous injections may throw light on this

problem when compared with the fate of those given cutaneous injections of B C G. What is already of great practical interest is the tuberculosis morbidity in Trysil since this mass experiment was started. Between the beginning of the experiment and November, 1929, signs of tuberculosis appeared in 20 persons. In four of these cases there was a history of tuberculosis dating back some time—a history obtained in 254 cases. Among 923 persons who had not previously shown any sign of tuberculosis clinically, but who had been Pirquet-positive, there were 10 who developed signs of tuberculosis. Among 171 persons not inoculated, although they were Pirquet-negative when first examined, there were 3 who subsequently developed signs of tuberculosis. Among the 1,094 who were not inoculated, who had previously shown no clinical sign of tuberculosis, and who had given either a positive or a negative Pirquet reaction, there were as many as 13, or 1.19 per cent, who subsequently developed signs of tuberculosis, whereas among the 1,079 Pirquet-negative persons who were inoculated, there were only 3, or 0.28 per cent, who subsequently developed signs of tuberculosis. In all these three cases the contact which had been the source of infection was discovered, and as in one of these cases the manifestation of tuberculosis (an outbreak of erythema nodosum) appeared only 30 days after the inoculation—*i.e.*, too early for the inoculation to have taken effect—the number of cases in which the inoculation apparently failed to induce immunity to tuberculosis may be reduced from three to two, or from 0.28 to 0.18 per cent. Comparing the tuberculosis morbidity of 0.28 (or 0.18) per cent among the inoculated Pirquet-negative persons with the tuberculosis morbidity of 1.19 per cent among the controls who were not vaccinated, the authors of this report claim that they have already made out a very convincing case for B C G inoculation of Pirquet-negative persons at various ages; but they admit that their figures are still too small, and the observation period too short for a statistical analysis which will conform to all the conventional requirements of a study of this kind.

Perfumes and Pigmentation

The use of cosmetics and perfumes has grown to enormous proportions in recent years. The fad is no longer confined exclusively to women. The male of the human species has begun to exhibit occasional indulgence in cutaneous applications that were once frowned on as unmasculine. The physician is only secondarily concerned with the social proprieties, the personal pecularities or the possible implications of these growing customs. Lotions and perfumery play a part in present-day life among a sufficient number of persons to raise the question of the physiological wisdom of the practice. Dermatologists may not agree as to the desirability of the repeated applications of alcoholic solutions, such as most lotions are, to the skin; they may differ with respect to the use of various types of greases more elegantly designated as cosmetics or skin creams. All admit, however, that idiosynerasies occur which express themselves in various types of dermatitis. A remarkable pigmentation of the skin originally described by Freund[1] in 1916 and later named berlock dermatitis by Rosenthal[2], has been subjected to renewed observation in this country by Gross and Robinson[3] at Columbia University College of Physicians and Surgeons. The condition results from the application of toilet waters to the skin immediately before it is exposed to the sunlight. Eau de cologne and also oil of bergamot, which is one of the essential oils used in toilet waters, have been found to have photosensitizing properties. The dermatitis that can be induced by artificial ultraviolet irradiation as well as by sunlight after applications of perfumes to the skin is usually found on the neck and chest, and appears as dark red areas changing to brown slightly mottled with red. The shape of such an area is usually similar to that of an area covered by a small drop of flowing fluid, and it generally appears during the summer. The New York dermatologists raise the question whether one is dealing with a personal susceptibility or with several factors, such as climate, perspiration, brand of perfume and short intervals between application of inciting cause and exposures to sunlight. In view of the fact that perfumes and toilet waters are so widely used and that sunbaths have become so popular, they are inclined to think that there must be some predisposing factor. The number of cases seen and the number of people under the conditions seeming to cause this dermatitis are not in proportion. In any event, the lovers of sunshine and the patrons of alpine rays may do well to bear in mind that in some persons the daub of the perfume bottle stopper may bring about leopard spots where they were not expected.—Ed. in *J. Am. M. Ass.*, July 5, 1930.

1. FREUND, *Dermat. Wchnschr.* **63**: 931, 1916.
2. ROSENTHAL, *Zentralbl. f. Haut-u. Geschlechtskr.* **13**: 322, 1924.
3. GROSS, and ROBINSON, *Arch. Dermat. & Syph.* **21**: 637, April, 1930.

Cancer-Producing Substances

The discovery in the Research Institute of the Cancer Hospital (*British Medical Journal*, June 7th, p. 1044) that a certain cancer-producing substance shows a blue-violet fluorescence which becomes very intense in a beam of ultra-violet light, and the hope expressed by Dr. Kennaway that it might be possible to state if products contain cancer-producing substances by analysing their spectrum, suggest ways of improving our knowledge of cancer. The most striking among many facts should be that a very high temperature appears to be necessary for the production of most of the cancer-producing substances; it has

therefore been assumed that living tissue is capable of a synthesis at low temperatures which can only be produced outside the body by the use of great heat.

In this connection it must be remembered that electronic action in many cases is able to promote the same synthesis as great heat. On metallic surfaces, for instance, rapidly moving electrons are present with a kinetic energy high enough to transpose molecules to one of their higher energy states (in this way catalysis may be explained). Such molecules are very active, and may return to their normal state by liberating energy in the form of radiation.

Now it is believed that radiation of one wavelength furthers cancer, just as another wavelength destroys cancer. In the same way cancer-producing substances may promote cancer by radiation directly or through intermediary products formed. The increase of cancer may therefore be a result of some of the methods used in the modern chemical industry. The hardening of fats, for instance, takes place in the presence of highly dispersed catalysts, which may not be quite removed before the fat is mixed into margarine. A minute quantity of substances able to cause radiation may thereby be introduced into the body, and the development of cancer be thereby promoted. That natural food seems to keep down the spread of cancer is in accordance with this view. Hence it should be of the highest importance to co-operate with food manufacturers to obtain products free from the possible cancer-producing substances which chemical treatment may be able to incorporate with them.—J. E. Nyrop, B.Sc., Copenhagen, in *Brit. M. J.* **1**: 1154, 1930.

Tularæmia in the Lemming

Hitherto the lemming has been regarded mainly as a nuisance to farmers and a warning to the obstinate. Sweeping down in millions from the mountains to the farms surrounding the lakes and fjords, these fearless little black-and-tan rodents acknowledge no obstacle; when they meet a man, they express their opinion of him in terse squeaky barks instead of passing by on the other side in apologetic silence; and when they encounter a lake or fjord in their migrations, they swim it—or try to. The sequel is often the pollution of the Norwegian waterways with countless corpses. As Dr. T. Thjötta, of the Army Bacteriological Laboratory in Oslo, points out in *Tidsskrift for den Norske Laegeforening* for June 1st, the public in districts subject to lemming invasion has identified certain symptoms with this rodent, grouping them under the collective term "lemming disease." The reports of medical officers of health seem, indeed, to suggest that there are at least two diseases traceable to the lemming: a gastro-intestinal form caused by paratyphoid *coli* bacilli, and a glandular form. Thjötta has examined an example of the first form bacteriologically, but what is of more interest in connection with the present world-wide study of tularæmia is his correlation of its manifestations with those of the glandular form of "lemming disease." They are, indeed, so like each other that, in his opinion, "one is fully warranted in identifying 'lemming fever' with tularæmia until the contrary has been proved." He has already demonstrated the existence of tularæmia in Norway among persons shooting hares or selling them in shops, and he has published 11 serologically proven cases. His first case was that of a medical man who, after shooting hares in the autumn of 1929, developed the ulcero-glandular form of the disease and was ill for months though still able to work. All, or nearly all, of the cases hitherto reported from Norway have been associated with hares, but as lice, flies, ticks, rats, and squirrels have been incriminated in one way or another in the propagation of this disease in other countries, it is probable that in Norway also its diagnosis in persons having no association with hares is only a matter of time. Dr. Thjötta's tentative inclusion of the lemming among the carriers of tularæmia will assuredly attract much material to his laboratory, and the forthcoming reports will be awaited with interest.—*The Lancet* **2**: 62, July 5, 1930.

Amytal

Amytal is the trade-name of iso-amyl-ethyl barbituric acid, and it has now been employed as an anæsthetic in a fair number of cases. As it is given intravenously it has the same disadvantage as the other drugs given by injection—namely, that it is only possible roughly to estimate the required dose, and this cannot be regulated by symptoms, and varied accordingly in the way that makes inhalation anæsthesia so comparatively safe. It appears that amytal, if used without risk, is rather a hypnotic than a true anæsthetic. For dogs in the laboratory it has been of great service as an anæsthetic, but for the human subject it is best used in the same way as avertin is—that is to say, as an excellent means of pleasantly inducing unconsciousness while the patient is in bed, so avoiding mental disturbance and rendering the patient easily susceptible to true anæsthesia induced by some other means. J. T. Mason and J. W. Baker[1] regard very favourably the combination of amytal and spinal anæsthesia. They say that "unless thoroughly familiar with both amytal and spinal anæsthetics the anæsthetist may find it easier first to establish the level of anæsthesia with the spinal anæsthetic, and thereafter administer the amytal. However, with studied judgment the most satisfactory of all results may be obtained by administering in the room beforehand sufficient sodium amytal to put the patient barely in a twilight stupor, such that he is free of anxiety yet can still be aroused to co-

1. *Surg., Gyn., and Obst.*, May, 1930, p. 828.

operate for the lumbar puncture." It seems that this cannot be an easy state to hit off exactly, for they remark that when the amytal is first given the patient often proves hypersensitive, and makes lumbar puncture difficult. The amount required to produce sleep is generally from grs. 3 to 9 and excitement before sleep comes is very rare. The sleep after operation is from 24 to 48 hours, and during this time the patient needs careful watching to avoid mechanical respiratory obstruction. Therefore appears to be considerable risk of insufficient pulmonary ventilation during this period, and also a large percentage of patients require catheterization.—*The Lancet* **218**: 1302, 1930.

The Price of Radium

In his recent presidential address to the Institution of Mining and Metallurgy, Professor J. G. Lawn referred to radium as affording the most striking example of high price in the whole history of metals. It is now worth approximately £14,500 a gram. There are 31.1 grams in the ounce troy, so that the value of radium is more than a hundred thousand times its weight in gold, and a ton at this price represents nearly twice the national debt. Professor Lawn added that radium had such valuable properties that in spite of its price there was a trade in it on a very small scale, the sales in 1928 amounting to some forty grams. The only consolation to be derived from Professor Lawn's figures is that the price, high as it is, is little more than half what it was during the war. In pre-war times the price of radium, obtained from Austria, was anything from £16,000 to £32,000 a gram. Then, for several years, it was produced on a fairly large scale in the United States from carnotite. During the war the price reached £25,000, and occasionally £27,000, afterwards becoming stabilized at £24,000, except for occasional sales of large quantities at a lower figure. Later, with the discovery of new sources of high-grade radium ore in the Belgian Congo, the cost of production was lowered to a price with which American carnotite could hardly compete, and the price was reduced from £24,000 to about its present level. Professor Lawn stated that radium is fairly widely distributed, and most countries possess ores which carry it, but it occurs in such minute quantities that there seems little hope that it may be produced on a larger scale or at a cheaper rate than at present.—*Brit. M. J.* **2**: 28, 1930.

The Scientific Examination of Pictures

The famous Italian pictures, which returned to their various homes last week, after being on crowded view in Burlington House for the past two months, evoked enormous general enthusiasm and, as was inevitable, certain discussions on the attributions. For more than ever is the authenticity of old masters becoming a serious financial matter, while the prices for genuine canvasses soar upwards under American desire of possession. It is significant of much that is happening in clinical medicine that recourse should be had to exact scientific methods in diagnosing the period of a painting and possibly the actual painter—critical acumen is taking its place with *tactus eruditus* as something personal whose value can be added to by employing the methods of laboratory technique. Dr. A. P. Laurie, Professor of Chemistry to the Royal Academy of Arts, has contributed to this month's issue of *The Analyst* an article—a record of a recent lecture delivered before his Society—upon the identification of pigments used in painting at different periods, in the course of which he gives a brief account of other methods of examining pictures. The technique employed closely resembles that of the pathological laboratory, and it is not suggested that the verdicts of these investigations are to take the place of the judgments of the instructed. Knowledge of the art of painting, its history, and the manners of the various schools, of brushwork, and of idiosyncrasies of well-known executants will remain the medium of identification, but the chemist and the radiologist can be drawn upon for assistance. Dr. A. Martin de Wild (see *The Lancet*, November 2nd, 1929, p. 932) has gone over the ground, when investigating the pigments used by the Dutch and Flemish masters from the fifteenth century onwards, and such a system of inquiry may give art critics a feeling, shared by many medical practitioners, that, with a disputed diagnosis as a possibility, the calling in of the chemist and radiologist is a measure of ordinary prudence.—*The Lancet* **1**: 702, March 29, 1930.

EPHEDRINE SULPHATE IN ACUTE SHOCK.—C. A. Johnson (*J. Am. M. Ass.*, May 3, 1930, p. 1388) adduces by animal experiments and gives reports to show that intravenous injections of ephedrine sulphate are useful in the treatment of shock due to severe trauma or hæmorrhage. The advantages of this drug are said to be that it is relatively non-toxic; has a pronounced hæmo-dynamic action, as well as a marked stimulant effect on the central nervous system; and that it continues to act over a long period, allowing the body to recover from the loss of blood and enabling other and less rapidly acting forms of treatment to be instituted. He cites four cases in which intravenous injections of 15 mg. of ephedrine sulphate, followed sometimes by larger doses, in the course of a few hours were highly effective. Johnson believes that in some instances the central nervous system depression seems to be the predominating factor, and the value of ephedrine sulphate in this connection is strongly commended.—*Brit. M. J.* Aug. 9, 1930.

Abstracts from Current Literature

MEDICINE

Effect of Certain Liver Extracts on the Blood Sugar of Diabetic Patients. Blotner, H., and Murphy, W. P., *J. Am. M. Ass.* **94**: 1811, 1930.

In a previous article the effect of liver on the blood sugar suggested that liver contains a blood sugar reducing substance, active when taken by mouth, non-toxic, and with an effect on the blood sugar concentration similar to that obtained with insulin, and that the feeding of liver over a period of time has clinical value in the treatment of diabetes mellitus. Six French writers as long ago as 1896 published articles concerning the beneficial effect of liver extracts in the treatment of diabetes.

The observations on the diabetic patients here reported were carried out doing fasting blood sugars, then one, three, five and eight hours after a test meal. An aqueous extract of liver was used; this was centrifuged and the supernatant fluid was found to contain a blood sugar reducing substance. The residue was apparently ineffective in lowering the blood sugar. The aqueous extract was next evaporated to varying degrees of dryness; both the paste and the powder were equally effective in lowering the blood sugar. This was administered to 23 diabetic patients under carefully controlled conditions. The observations suggest that certain aqueous liver extracts contain a blood sugar reducing substance, active when taken by mouth, non-toxic, and with an effect on the blood sugar concentration similar to that obtained with small doses of insulin.

LILLIAN A. CHASE

The Incidence of Primary Carcinoma of the Lung. Rosahn, P. D., *Am. J. M. Sc.* **179**: 803, 1930.

The author finds, from a statistical study of primary carcinoma of the lung, that there is both a relative and absolute increase in that disease during the last decade. He has included in his study only those cases which have been verified by autopsy as well as microscopical section of the tumour. Percentages have been calculated on the basis of total adult autopsies. A summation of the cases reported by various authors from 1910 to 1919 showed that primary carcinoma of the lung occurred in 0.44 per cent of 74,000 necropsies as compared with a corresponding period from 1920 to 1928 when the incidence was 0.89 per cent, an increase of 100 per cent. When the total lung cancers are considered in relation to total cancers in these two time-periods, the percentages are 4.39 and 6.98 respectively, an increase of about 37 per cent. In conclusion, the author points out that primary carcinoma of the lung is not so rare as was formerly believed. It should, therefore, be given serious consideration in differential diagnosis in patients of the carcinomatous age presenting puzzling lung signs and symptoms.

E. S. MILLS

Myxedema during the Administration of Iodine in Exophthalmic Goitre. Thompson, W. O., Thompson, P. K., Brailey, A. G., and Cohen, A. C., *Am. J. M. Sc.* **179**: 733, 1930.

The authors report periods of myxœdema following the administration of iodine to four patients suffering from a mild form of exophthalmic goitre. During the myxœdematous phase the patients gained in weight, the pulse became slower, œdema appeared about the face and extremities, and the basal metabolic rate was depressed considerably below the normal level. As a rule when iodine was discontinued, the signs and symptoms of hypothyroidism disappeared and the basal rate returned to about its former value. The state of myxœdema in these patients could also be terminated if, instead of discontinuing the iodine, thyroid extract was administered with the iodine. Such periods of myxœdema were observed immediately following subtotal thyroidectomy and also years after the operation when iodine was being administered. The authors believe that the myxœdema which occasionally develops during the administration of iodine to patients after thyroidectomy with a normal basal metabolic rate is due to an inhibition of the secretion of the normal thyroid hormone. It is suggested that the reduction of the high basal metabolic rate in exophthalmic goitre by means of iodine therapy before operation is brought about in the same manner. The authors admit, however, that only isolated cases of the disease exhibit these periods of myxœdema and that this response to iodine is by no means a constant one, even in the individual patient.

E. S. MILLS

Emotional Hypertension. Stieglitz, E. J., *Am. J. M. Sc.* **179**: 775, 1930.

Stieglitz draws attention to a type of transient hypertension occurring in young adults as a result of emotional stimuli without concomitant cardiovascular disease. The condition as a rule occurs in young women. There is invariably a history of marked emotional instability, frequently characterized by a sense

of sexual repression or by phobias of various types. Flushing and urticarial blotches about the face and neck are common. Dyspnœa, air hunger, or pounding of the heart occur on slight emotional stimulation, rather than during physical exertion.

Examination during embarrassment or nervousness reveals no evidence of cardiac disease, but the arterial tension is found to be considerably elevated, commonly in the vicinity of 190 with a diastolic reading of 100 to 120. A second examination when the attack has passed off shows that the blood pressure is normal. It is believed that heredity may play some rôle in the production of the arterial instability, as the majority of the patients are emotionally similar. They are tense, absorbed, unable to relax, and often depressed. There is no clinical evidence of adrenal dysfunction or of hyperthyroidism. It is uncertain whether the primary fault lies in an inherent emotional or psychic instability, or whether the latter results from the circulatory disturbance.

Partial or complete relief of the condition is obtained by reassurance, and the use of bismuth subnitrate in ten grain doses four times a day. The action of this drug is to produce a prolonged and persistent arterial relaxation. Bismuth subnitrate is but slowly soluble so that a continuous liberation of NO_3 occurs in the bowel. In the presence of colon bacilli the NO_3 is reduced to NO_2 thus assuring a continuous nitrite action. The author believes that this emotional hypertension may form the basis of later permanent arterial hypertonia. Four cases illustrative of the condition are cited.

E. S. MILLS

The Effect of Single Massive Doses of Liver Extract on Patients with Pernicious Anæmia. Riddle, M. C. and Sturgis, C. C., *Am. J. M. Sc.* **180**: 1, 1930.

The authors have investigated the response of patients with pernicious anæmia to a single massive dose of liver extract. In place of giving the usual amount, which is the contents of one vial three times a day, the contents of thirty vials were given at one time by means of a stomach tube. This corresponds to three thousand grams of whole liver. When the extract was vomited it was filtered and replaced by stomach tube. The patients were observed at four hour intervals for a period of ten days. It was found that the reticulocyte response and the rise in other cellular elements of the blood were in all respects comparable to that expected when the extract is given in the usual way. The reticulocyte increase began two days after the single dose of extract and reached its zenith in five or six days, returning to normal about the tenth day. In addition to the reticulocyte response, there occurred a "blast crisis", that is, the appearance of nucleated erythrocytes and immature leucocytes in the circulating blood. The first nucleated red cells to appear were megaloblasts. These cells made their appearance from twelve to sixteen hours after the massive dose of extract. In about thirty-two hours these were replaced by normoblasts. After two days only an occasional nucleated form was observed. Myelocytes appeared simultaneously with the myeloblasts, and during the second day formed about 5 per cent of the total leucocytes. As regards the duration of the response to the single large dose of extract, it was found to last about ten days which is in accordance with the findings when daily doses of liver extract are used.

E. S. MILLS

Ueber die chronische Steifigkeit der Wirbelsäule. (On chronic Stiffness of the Spine.) Grashann, H., *Mitt. a. d. Grenzgeb. d. Med. u. Chir.* **41**: 637, 1930.

As causes of chronic stiffness of the spinal column the author cites the following conditions: spondyloarthritis ankylopoietica, spondylitis deformans, tuberculosis, actinomycosis, gonorrhœa and syphilis (the cervical portion preferred here), vertebral arthropathies, syringomyelitic scoliosis, meningomyelitis, neuralgia, tumours of the spine, muscular involvements, myositis ossificans, lumbago, rheumatism in the muscles of the back, polyarthritides, the kyphosis of adolescence, osteochondritis dissecans, osteomalacia, osteitis deformans, contusions, fractures, Kümmell's disease, anatomical and numerical variations. A referred stiffness of the spine may be excited by pleural affections, chronic retroperitoneal inflammations, and disease in the true pelvis. Arthritis deformans, as it affects the spine, is very common among mountaineers, so that it might almost be called an occupational disease. On the other hand, spondylitis ankylopoietica is rare among these people. In contradistinction to spondyloarthritis ankylopoietica, spondyloarthritis deformans does not attack the whole spine, or even a section of it, but a single vertebra. Spondyloarthritis deformans is a degenerative process; the ankylopoietic, an inflammatory one.

A. G. NICHOLLS

Neue Fragen in der Klinik der syphilitischen Mesaortitis. (New Questions in regard to the clinical features of syphilitic mesaortitis). Schlesinger, H., *Med. Klin.* **26**: 3, Jan. 3, 1930.

The cardinal symptoms indicative of syphilitic mesaortitis are: a characteristic burning pain in the retrosternal region, which often lasts for hours; a systolic murmur over the aortic region, with an accentuated second sound, and normal pressure; the roentgenological demonstration of dilatation of the ascending aorta; and a positive Wassermann test. Hypertension does not weigh

against the diagnosis of mesaortitis. In these cases hypertension may exist without renal involvement or cerebral complication. Even in the presence of only one important symptom the diagnosis of mesaortitis may be hazarded, for larval forms are rather common. In cases where there is no history of trauma nor of endocarditis the existence of an aneurysm of the aorta may be taken as evidence for mesaortitis. Aortic insufficiency in a middle-aged person, without a history of endocarditis, is as a rule an indication of mesaortitis. The same significance may be attached to aortalgia in the case of a non-smoker, as also to a permanent systolic murmur over the ascending aorta in a person under fifty years of age, who has never had endocarditis. Finally, stenocardia or cardiac dyspnœa, in a patient under fifty without evidence of previous infection or intoxication, is suggestive.

Angina pectoris is of importance in this connection, as one-third of all angina cases are of syphilitic origin. The diagnosis is all the more certain if the following combinations are present: aortic insufficiency with angina pectoris; angina pectoris or aortalgia with cardiac dyspnœa; aortalgia with an accentuated aortic second sound; a circumscribed dilatation of the ascending aorta, as shown by x-ray examination, with cardiac dyspnœa; or any of the signs of aortic lues with central luetic disease, such as Argyll-Robertson pupil.

Treatment should be begun with iodine and bismuth, or iodine and mercury, gradually replacing this with salvarsan. This treatment must be carried out cautiously, otherwise a prolonged stenocardiac attack or severe cardiac dyspnœa may be produced. The therapeutic result may be enhanced by an intercalated non-specific therapy with proteins or sulphur compounds. The induction of malaria as a curative measure seems to have no value.

A. G. NICHOLLS

Retinal changes and mental retardation in a member of a family in which two cases of Schilder's disease have occurred. Macnamara, E. D., *Proc. Roy. Soc. Med.* **23**: 523, 1930.

In this family of five children, the parents of whom were healthy, the second and third children, both girls, had died of Schilder's encephalitis. The fifth child, also a girl, had been delivered by Cæsarean section. At 16 months she could neither walk nor stand. She had just acquired the art of sitting up and could say a few words. At 2½ years she was attempting to stand. The eyes showed strabismus, optic atrophy, and retinal pigmentation. The limbs were normal but weak. Abdominal reflexes were present; plantar reflexes were flexor in type; patellar and ankle reflexes were not elicited.

In this connection it may be well to recall the clinical picture of Schilder's encephalitis as laid down by Collier (*Brain*, **27**: 489, 1924).

The malady is one occurring usually in children and young subjects with no tangible causal factors or antecedents. The onset is within a few days; the course is progressive with some remissions to a fatal issue; the duration from a few months to three years. The chief early sign is cerebral blindness which becomes complete, to which is added mental reduction and increasing spastic paralysis. Unsteadiness from parietal involvement, and deafness from temporal involvement may be notable. The mentality becomes progressively lowered; coma usually terminates the picture. The pathology is that of a massive affection of the white matter of the cerebral hemispheres, considered to be toxic in origin and inflammatory in nature, characterized by disappearance of the myelin, and ultimately of the axis cylinders, although these remain intact for a long time.

In view of the fact that the picture appears to be an abiotrophy rather than a true inflammatory reaction to a toxic agent, and because it has not infrequently been encountered in more than one child in a family, the question arises whether Schilder's encephalitis should not be listed with the hereditary diseases?

MADGE THURLOW MACKLIN

SURGERY

Duodenitis and Duodenal Ulcer. Wellbrock, W. L. A., *Ann. of Surg.* **91**: 533, April 1930.

The author points out that many cases diagnosed as duodenal ulcer show only a localized thickening of the duodenal wall when operated upon. This thickening is believed to be the result of a duodenitis. Duodenitis may occur as a simple inflammatory process, inflammation with erosion, chronic inflammation, or as a healed ulcerated duodenitis. The usual microscopic findings of inflammation are present, plus sclerosis of the blood vessels. The degree of the latter varies directly with the chronicity of the process. Similar changes occur in the process of development of an ulcer, suggesting a definite relationship between duodenitis and ulcer.

The article is the result of the study of over two hundred excised specimens.

STUART GORDON

Prolapse of the Rectum in Children. Fraser, Ian, *Brit. M. J.* **3622**: 1047, June 7, 1930.

Whilst constipation, diarrhœa, worms, polypi, adenomata, piles, fissure, balanitis, and a loss of ischio-rectal fat have been named as possible etiological factors in this condition their importance is doubted by the author. Prolapsus ani is a prolapse of the rectal mucous mem-

brane through the anal canal. The average case presents: (1) A patulous anal canal; (2) a mucous membrane that has lost its grip upon the muscle wall.

In the majority of cases no cause can be found. Injection of one c.c. of absolute alcohol between the mucous membrane and the muscle coat is advocated as the best method of obtaining an immediate cure. The procedure is carried out under general anæsthesia, 0.25 c.c. of the alcohol being injected in front, at the sides, and at the back of the anus. Cure results in 90 per cent of cases, a second treatment being required in 10 per cent. Following the injection the buttocks are strapped for 24 hours. A bowel movement is induced in 24 to 36 hours.

STUART GORDON

Goitre: Management of the Poor Surgical Risk. Pemberton, J. De J., *Arch. Surg.* **20**: 591, April 1930.

It is the opinion of Pemberton that a new era has opened since the introduction of iodine in the pre-operative preparation of patients with exophthalmic goitre. The administration of iodine has a pronounced effect on the pathological changes in the gland, and the course of the disease, as evidenced particularly by the change in the symptoms and the appearance of the patient, by lowering of the basal metabolic rate, and by the absence of severe post-operative explosive reactions. Convalescence has been smoother, there has been a marked reduction in ligations and operations performed in stages, also a marked decrease in the operative mortality. The introduction of iodine into the method of preparing the patient under co-operative management has wrought a complete change in these conditions, for no longer does the spectre of death from an unexpected post-operative explosion continually confront the surgeon. The cause and prevention of all post-operative deaths under present management should be searched for by the surgeon. Pemberton attempts to answer the question whether there are to-day any recognizable factors in the patient's condition that influence the hazard of operation? He has reviewed all the patients with exophthalmic goitre, and those with adenomatous goitre and hyperthyroidism who were operated on in the Mayo Clinic from January 1, 1925, to December 31, 1928, inclusive, with the idea of determining the influence on the mortality rate, of age, duration of the disease, and the severity of the hyperthyroidism, as measured by the metabolic rate. Other factors, such as debility and the degree of myocardial or hepatic degeneration, can often be detected clinically, but as they cannot be precisely estimated, were not considered. During this period 5,081 patients were operated on for exophthalmic goitre, and 2,171 for adenomatous goitre with hyperthyroidism. Forty-six of the former died, a mortality rate of 0.9 per cent, and 29 of the latter, a mortality rate of 1.3 per cent.

In 3,604 of the cases of exophthalmic goitre, the time of onset was definite, and these were grouped under three headings, according to the duration in months of the hyperthyroidism. For comparison a similar study was made of the records of all the patients with exophthalmic goitre operated on during the years 1919, 1920, and 1921, who had not been given iodine. Of the 1,950 patients, 81 died, a mortality rate of 4.15 per cent. In 1,308 cases the time of onset of the disease could be determined and they were grouped similarly, according to the duration of the hyperthyroidism. From these comparisons, it is evident that the administration of iodine in surgical cases of exophthalmic goitre has been the means of lowering considerably the mortality rate. In both series, the duration of the disease exerted a pronounced influence on the mortality rate, more marked in the later series in which iodine had been given. This can be explained by the fact that in the early case of exophthalmic goitre there is usually only one additional operative hazard, the severity of the hyperthyroidism, while in the late case there are two, the severity of hyperthyroidism and the presence of visceral degeneration. In those patients having adenomatous goitre with hyperthyroidism, the duration of the hyperthyroidism had an equally significant influence on the mortality rate.

Age plays a far more prominent part in the mortality rate of patients who are suffering from adenomatous goitre with hyperthyroidism than of those who have exophthalmic goitre.

It was clearly demonstrated in this series that the height of the basal metabolic rate was a significant factor in the mortality rate. A considerably larger percentage of deaths occurred if the basal metabolic rate was more than plus 50 than if it was less than plus 50, and the higher the rate above plus 75 the greater the operative risk. Only seven, or 0.14 per cent, of the patients operated on for exophthalmic goitre with preparatory iodine administration, died from a post-operative hyperthyroid reaction within twenty-four hours; while in the other series of cases where no iodine had been given prior to operation, twenty, or 1 per cent, died. The effect of iodine was greatest on patients with a moderate or low basal metabolic rate. The influence of the height of the metabolic rate on the surgical hazard in the patients with adenomatous goitre with hyperthyroidism is similar to that in cases of exophthalmic goitre.

Pemberton enumerates the increased potential hazards in the surgery of toxic goitre thus: (1) the development of an overwhelming post-operative hyperthyroid crisis; (2) the de-

bility of the patient resulting from the intensity of the disease or the long continued hyperthyroidism, advanced age or from some intercurrent disease; and (3) increased technical difficulties occasionally met with in large obstructive goitres. The grading of operative risks was made on the basis of 1, 2, 3 and 4.

In the treatment of the patient who is a poor surgical risk there are three stages, the pre-operative, the operative and the post-operative, each of which is equally important. During the stage of pre-operative treatment the patient is under the care of the internist and the surgeon. Iodine, a diet light in calories and adequate rest are essential. Eight to twelve days or even longer may be required for proper preparation. Digitalis is seldom given, and generally to patients with cardiac decompensation, when rest alone has failed to restore the compensation. Patients with degenerative liver changes or those with diabetes mellitus may have the glycogen reserve materially increased by pre-operative preparation, in the first group, by the intravenous injection of 10 per cent dextrose in sodium chloride solution, and in the second, by a diet high in calories, and rich in carbohydrates, supplemented by adequate insulin to make possible utilization.

Regarding the operative treatment the author is averse to the use of any one particular anæsthetic. Prolonged inhalation anæsthesia is deleterious to the handicapped patient. He has found infiltration with procaine hydrochloride, supplemented by nitrous oxide and oxygen, the most satisfactory method of anæsthesia. Sodium amytal has been employed at the Mayo Clinic with success, but the one disadvantage is that the patient is asleep during the operation so that it is not possible to test the vocal cords.

Injury to the recurrent laryngeal nerve, and post-operative hæmorrhage, are the two chief accidents which may occur. A constricting suture around this nerve will result in permanent paralysis. Ligation of one or both inferior thyroid arteries at a point proximal to their entrance to the gland, or packing the cavity and leaving the wound open, may be necessary to prevent hæmorrhage.

A large percentage of the patients do not require any special post-operative treatment. For the most frequent complications, such as obstructive dyspnœa, acute hyperthyroid reaction, pulmonary œdema, and infections, the prompt institution of proper treatment is necessary. Where there is cyanosis with any of these complications oxygen treatment, particularly in the oxygen chamber, is of great value.

G. E. LEARMONTH

OBSTETRICS AND GYNÆCOLOGY

Ovarian Deficiency as a Cause of Sterility. Macomber, D., *Am. J. Obst. & Gyn.* **19**: 739, June 1930.

In every species of which anything is known the number of young born is not so great as the number of ova formed. In the rat there is, under the most healthy conditions a mortality of 16 per cent. Where the diet or other conditions are not of the best this may be much greater. A reduction in the calcium intake will thus increase the mortality to 24 per cent. There is a probability that, on the whole, ovulation in man, as in all of the lower animals, is correlated with other sex phenomena, and that it can be affected by various external agents such as the amount and kind of food, climate, general health, etc. Every sterile couple comes to us with the result of a biological experiment. If we find on post-coital examination sufficiently numerous and active spermatozoa in the cervix and uterus, and if the tubes are normally patent, the presumption is that we are dealing with ovarian deficiency. Ovarian deficiency rarely gives rise in itself to any other symptoms than the resulting sterility. Many of the conditions which cause it, however, do have definite symptom complexes, and the finding of any of these in a case of sterility should make us suspect this functional disorder.

The factors in the environment thus affecting the ovarian function are: first, those associated with pelvic disease, including (a) retroversion, when it affects the ovarian circulation, (b) varicose veins of the pampiniform plexus, and (c) cystic ovaries; secondly, those which are purely functional, including (a) cases of simple congestion, (b) constitutional causes, such as anæmia, obesity, or endocrine disorder, and (c) cases where there is an emotional background.

The cystic ovary that is important in sterility is due either to a cystic degeneration of a corpus luteum, or to a failure of the follicles to mature and rupture with the ultimate production of a moderately enlarged ovary covered with a smooth, often thickened, capsule without the typical puckered appearance, and containing on section, numerous small cysts. As a rule they cause no inconvenience, and only a most careful pelvic examination will disclose their presence. Improvement of the pelvic circulation and stimulative treatment of the ovaries will often succeed in restoring the function to normal. If enlargement is extreme, or persists in spite of treatment the only hope remaining is operation.

In cases of ovarian deficiency of constitutional or emotional origin, menstrual disturbances, especially reduced activity, are most common. The common constitutional causes are nutritional and metabolic disorders with

either under- or over-nutrition and high or low metabolic rates; anæmia; and abnormal function of either thyroid or pituitary glands. Chronic pelvic congestion may have a purely emotional cause, and, until that is removed, treatment remains unsuccessful. It is certain that sterility is on the increase, and we may well blame our modern over-stimulated lives for a part of this increase.

The first principle in treatment is the removal of the specific cause—*e.g.*, the treatment of a retroversion with pessary or operation; the removal of emotional worry or bad sex habit; or the treatment of cystic ovaries. The next problem is to get the ovaries back to normal function by applying ovarian stimulation. Our future hope lies with a potent female sex hormone. But at present we must be content with general, and often unsatisfactory, measures, such as diet, exercise, operation on the ovaries, and, lastly, the use of minute doses of x-ray. Ten illustrative cases are recorded.

ROSS MITCHELL

PÆDIATRICS

Human Contagion and Tuberculous Infection in Childhood. Schlesinger, B., and Hart, P. D., *Arch. Dis. Child.* **5**: 191, June 1930.

After a review of the literature on tuberculosis surveys, these authors report the results of an investigation of 731 London children of the hospital class, with special reference to the degree and type of exposure. All the children of the series were under fifteen years of age; 118 came from tuberculous households, and 513 from homes free from tuberculosis. All cases of suspected or definite clinical tuberculosis were excluded from both groups. Each child was tested with 0.1 mgm. of old tuberculin intracutaneously.

By six years of age half, and by ten years of age three-quarters of the home-contact series were infected, whereas only one-fifth and one-third of the non-contact controls were positive reactors at these respective ages. The tuberculinization of home-contacts has its maximum rate in infancy and early childhood, whereas the tuberculinization of home-contacts has approximately the same rate from birth to late adolescence.

When their data were analyzed from the standpoint of the degree of intimacy of the tuberculous contact, it was seen that children living with a tuberculous relative show tuberculin reactions more frequently than children with tuberculous relatives who do not live with them; and the latter more frequently than children with no tuberculous relatives; that the incidence of positive reactions was highest in those children most intimately exposed to an open case; and that tuberculin reactions were no more frequent in children living in intimate contact with relatives who had non-pulmonary tuberculosis than among children of non-tuberculous households or children with no tuberculous relatives.

Variations in the intimacy, frequency, and duration of contact will adequately explain these findings, without assuming the existence of inherited predisposition. The authors believe that a positive family history of tuberculosis is of importance in producing infection only in so far as it yields a potential intimate source of contagion in the form of an open pulmonary case. They suggest that the belief that a tuberculous ancestry implies a tuberculous diathesis is untenable.

A. K. GEDDES

The Significance of the Protein Content of the Cerebro-Spinal Fluid. Grey, F. F., *Arch. Dis. Child.* **5**: 187, June 1930.

Grey believes that the estimation of its protein content is by far the most valuable single investigation that can be done on the spinal fluid. He describes a method by which it is possible to decide in a few minutes whether a meningitis may be ruled out. To each of a series of twelve tubes containing from 0.010 to 0.100 mgm. albumin in 1 c.c. of saline is added 0.1 c.c. of 25 per cent salicylsulphonic acid. The resultant colloidal dispersions serve as graded opacity standards for the estimation of the protein in 1 c.c. of spinal fluid, to which is added 0.1 c.c. of salicyl-sulphonic acid.

In his series of 101 cases Grey found that fluids showing a protein content of less than 0.04 per cent were normal; that a protein percentage of between 0.05 and 0.15 invariably indicated tuberculous meningitis; and that fluids with a protein of from 0.30 per cent to 0.72 per cent were from cases of either pneumococcal or meningococcal meningitis. No data are given for cases of encephalitis.

A. K. GEDDES

UROLOGY

The Recognition and Treatment of Renal Lithiasis. Chute, A. L., *Minn. Med.* **12**: 731, Dec. 1929.

Certain factors appear to predispose to stone formation, though their occurrence in a given case is often difficult to explain. Among these factors, anomalies of the renal pelvis and calyces giving rise to stasis, infections, and changes in the chemical balance are most important. Stones in the kidney may exist for long periods and produce marked damage without giving rise to the classical symptoms. Unfortunately, large stones held firmly in the kidney, causing atrophy as they increase in size and predisposing to suppuration, do not cause the marked symptoms that

are brought about by the smaller stones that block the outlet and cause acute dilatation of the renal pelvis. Such large stones frequently give rise only to backache or vague abdominal pain, considered to be due to "indigestion" and often treated as such, until the finding of pyuria leads to proper investigation and diagnosis.

In the radiographic investigation of any case it is most important that the entire urinary tract be included, regardless of the localization of symptoms. Uric acid stones may not cast a shadow, especially if they are lying in a collection of urine. Therefore, if one suspects their presence it is wise to drain the renal pelvis, or even to inject a small amount of pyelographic medium before taking pictures. When a definite shadow has been shown it is necessary to determine its exact position in the kidney or ureter, and also to exclude other confusing shadows. Chief among these are foreign bodies in the bowel, calcified glands, gall-stones and phleboliths. There are certain characteristics of each which will often give a clue and this may be confirmed by ureteral catheterization and pyelography. An "offset" plate consisting of two exposures on a single film, the second being taken after moving the tube a short distance laterally will settle any question as to the relation of a given shadow to the opaque catheter.

The advice given will depend on the size of the stone, the presence of infection, the condition of the kidneys, and the condition of the patient. A renal stone larger than one-quarter of an inch in its smallest diameter should be removed. It is bound to increase in size, and will end in infection and destruction of the kidney, hence it is especially important to remove a stone in case of a single kidney. When stones are bilateral (12 per cent of all cases) the better side should be first operated on. Small uninfected renal stones are best removed by pyelolithotomy, the incision being made on the posterior surface of the pelvis and in the direction of its long axis. A small pad of fat over the line of incision facilitates closure with a few loose sutures. When the stone is large, or when there is much infection, nephrolithotomy, splitting the kidney back of its convex margin is most generally employed. Drainage should always be employed preferably by carrying a soft rubber tube through into the renal pelvis. Adequate drainage is most important for the obliteration of any cavity left by the stone. Ureteral stones causing repeated severe pain or infection should be removed. If the stone is small and low down and infection not superadded one may try repeated dilatation. That portion of the ureter above the level of the third lumbar vertebra is best reached by a lumbar incision. The lower ureter is approached also extraperitoneally, either by an incision along the outer edge of the right rectus or by an incision three-quarters of an inch above and parallel to the fold of the groin. The ureter will be identified as it crosses the iliac vessels at the pelvic brim and it usually adheres to the peritoneum. A low stone may accidentally slip up to the renal pelvis during manipulation, but more commonly stones are tightly impacted and difficult to "milk" upward to an accessible point. Hence it is usually necessary to make the incision above the stone and pass a forceps down, using the fingers at the site of the stone as a guide. After removal of the stone one must always make certain that the ureter is patent to the bladder. Suture of the ureter is immaterial, but drainage is essential.

N. E. BERRY

OPHTHALMOLOGY

Classification of Retinitis. Fuchs, E., *Arch. Ophthal.* **3**: 394, April 1930.

The usual classification of retinitis is according to etiology, such as retinitis syphilitica, diabetica, etc. In another sense one may distinguish between primary and secondary retinitis. In the first the primary seat of the inflammation is the retina itself; in the second the inflammation passes into the retina from a contiguous tissue—for instance the choroid. From an anatomical standpoint, one may distinguish the retinitis interna from a retinitis externa, also according to the class of inflammation, an alterative, exudative, or proliferative retinitis. In the case of the alterative, degeneration of the histological elements is predominant, as in retinitis albuminurica; in exudative, the exudation at the surface is prevalent. Proliferative retinitis is distinguished by the proliferation of the normal elements of the tissue, as in retinitis tuberculosa.

The inflammations in general may be divided according to the tissue affected in the first place. Applying this division to the retina, the tissue affected primarily may be either the epiblastic or nervous, or the mesoblastic or supportive part. The different classes of retinitis from the standpoint of the germinative layers are then discussed in detail. Fuchs deals, in the first place, with the epiblastic part of the retina, composed of three neurons, and, in the second place, with the mesoblastic tissue.

Diseases of the retina originating in the vessels are due to an abnormal condition either of the blood or of the walls of the vessels. In the first case, one may have to deal with diseases of the blood such as hyperglobulia (polycythæmia), pernicious anæmia, leukæmia, etc., which are so often complicated by retinal hæmorrhages, or the blood may contain poisonous substances. Such toxins doubtless play a great rôle in many cases of retinitis, such as the albuminuric form. The blood may also carry corpuscular elements which may form within the blood as clots, obstructing retinal vessels by embolism or thrombosis; or

these elements may be aliens in the blood, as parasites, which in milder cases cause retinitis septica (Roth), and in severer cases a metastatic retinitis terminating in panophthalmitis. In most cases the parasites are the ordinary bacteria. Metastatic, in a wider sense, are the chronic inflammations caused by the parasites of tuberculosis and syphilis. The retina has little predisposition to tuberculosis. Primary tuberculosis of the retina is rare. Regarding the rôle played by the wall of the vessels, the trouble may be functional or organic. Whether albuminuric retinitis is due to a permanent spasm of the retinal vessels, or whether the retinitis is caused by substances retained in the blood because of insufficient function of the kidneys or by some other toxic substances has not yet been ascertained. Hæmorrhages subsequent to rupture of the vessels, if not of traumatic origin, must be ascribed to a morbid condition of the wall of the vessel, which causes it to break even when the blood pressure is normal, and still more readily if the pressure is increased. If bacteria get into the vitreous body, they cause a severe purulent retinitis, although they do not penetrate into the retinal tissue. This is the case only in metastatic retinitis.

S. HANFORD MACKEE

Aniridia in four generations. Lewis, J. B., *Med. J. Australia* **1**: 489, 1930.

This affection of the eyes, which is by no means uncommon, has been reported in numerous families, usually showing a direct mode of inheritance, passed on from affected parent to child. Lewis's pedigree extends through four generations affecting seven of ten persons, namely the man, his son, the latter's two daughters and a son, as well as one son of each of the daughters. A second son of one of these affected women showed coloboma iridis, a trait that is often interchangeable, in a family of this type, with complete aniridia.

MADGE THURLOW MACKLIN

Aniridia occurring in three generations. Croll, L. J., *Arch. Ophth.* **2**: 698, 1929.

Croll reports a family suffering from aniridia accompanied by nystagmus and photophobia. Glasses were of no help and the vision was very poor, ranging from 5/200 to 20/200. The affected members were three sons and a daughter (one son being normal), their mother, her two sisters, their maternal grandmother and her three brothers. The condition of the great grandparents' eyes was not known.

This pedigree illustrates a type of inheritance most frequently found in this condition, namely the direct; that is, no child exhibits the defect unless one of the parents also exhibits it.

MADGE THURLOW MACKLIN

Beiträge zur Kenntnis von der Vererbung der markhaltigen Sehnervenfasern der Netzhaut. (Contributions to our knowledge of the inheritance of medullated nerve fibres in the retina). Kiso, K., *Arch. Ophth.* **120**: 154, 1928.

In a family of five children, a brother and sister were found to have medullated retinal nerve fibres. Three sisters were normal, but their children, namely a boy, a boy and two girls, showed the same condition that was present in their aunt and uncle. Kiso concludes that it suggests sex-linked heredity, a conclusion that can be readily called into question since it certainly is not sex-linked and dominant, and if it were recessive, it would necessitate the father of the family of five and the father of the two affected girls being subject to this condition themselves. Such a rare condition would not be apt to occur in this fashion, unless there were consanguineous marriages, which are not mentioned. It is probable that the type of inheritance is somewhat more complex than that stated.

MADGE THURLOW MACKLIN

HYGIENE AND PUBLIC HEALTH

Causes of Death by Occupation. U.S. Dept. of Labour, Dublin, L. I., and Vane, R. J., Feb. 1930.

This is a study of the occupation and the cause of death and the inter-relation of these factors among the 105,467 white male policyholders of the Industrial Department of the Metropolitan Life Insurance Company who died during the years 1922-24. A comparison with a similar study made in 1911-13 is also made.

In the first place it is clear that within the same social class the death rates of male wage earners are uniformly higher than those among females, with the single exception of those in the age groups 15-24; it is, of course, during this period that females of the working class are most commonly employed in large numbers. The death rates of male wage earners also greatly exceed the death rates of policyholders in the ordinary division (who are mostly of the business and professional class) and those prevailing among males in the population as a whole.

Differential death rates of the various age groups show that this disparity increases year by year up to the age of 54. Compared with workers in non-hazardous employments, industrial wage earners are at a disadvantage in respect to all important causes of death. The death rate from tuberculosis, age for age considered, is especially high in the industrial groups, and ranges from two and a half to

nearly five times that of the non-industrial population. Deaths from pneumonia and accidents are over twice as frequent, while death rates from the degenerative diseases are from two to three times as great. The writers believe that there are definite deleterious effects to workers in industry and that these effects are cumulative.

It is gratifying to note that there has been a tremendous improvement in mortality among the industrial workers since the date of the last survey, eleven years previously. The death rate during this period declined from 16.21 per 1,000 to 11.83, and great gains were made in nearly every disease. The decline in the mortality from pulmonary tuberculosis from 319.9 per 100,000 to 149.7 was notable. The marked improvement, it is felt, is a direct result of the increased wages and shortened hours of labour among American workers, of more modern buildings, of greater attention to ventilation, of industrial safety movements, and of greater attention to the health and welfare of the workers. Incidentally, the improvement among the industrial workers has been much greater than among the general population in the same period.

The proportionate mortality, that is, the percentage of deaths in the groups as a whole (or in one occupation) from one cause of death in respect to the total number of deaths in the groups has been worked out, and from that a "standardized relative index" has been calculated. This latter figure is the ratio between the standardized percentage for a given cause in a selected occupation and the corresponding percentages for all males. A positive association is most clearly marked in the case of accidental violence, tuberculosis, the non-tuberculosis, respiratory diseases, alcoholism and lead poisoning.

R. VANCE WARD

Pernicious Anæmia in Recent Years. Statistical Bulletin. The Metropolitan Life Insurance Co., June, 1930.

When the discovery of insulin was announced it was thought that a general decline in the diabetes death rate would result. Unfortunately this hope was not realized. In 1926 Minot and Murphy published their observations on the use of an abundant diet of liver in the treatment of pernicious anæmia. Almost immediately the new treatment was taken up all over the country. In contrast to the results with diabetes the liver treatment seems to have resulted in a significant fall in the death rate from pernicious anæmia. The records of the Metropolitan Life Insurance Company (which like the Literary Digest polls seem to constitute a reliable index of the country) indicate this quite definitely. The death rates from pernicious anæmia, according to the experience of the Industrial Department of this company are as follows:

Death rates per 100,000 from Pernicious Anæmia

Colour: sex: age	1921	1922	1923	1924	1925	1926	1927	1928	1929	Average 1921-1929
White males										
25 to 34	0.3	0.7	0.4	0.5	0.7	0.9	0.8	1.2	0.3	0.7
35 to 44	2.4	2.3	2.4	3.6	4.1	2.3	2.5	1.6	1.0	2.4
45 to 54	5.3	5.3	8.7	6.1	6.8	8.7	3.8	3.0	3.5	5.6
55 to 64	12.3	11.5	13.8	17.1	16.8	14.7	14.4	10.2	7.6	13.0
65 to 74	19.7	17.8	17.8	18.2	17.4	33.6	23.3	19.7	21.1	21.2
White females										
25 to 34	1.5	2.7	2.0	1.5	1.3	1.7	2.0	0.9	0.5	1.5
35 to 44	5.4	5.9	3.8	5.4	5.6	4.8	3.6	2.9	2.4	4.3
45 to 54	9.0	9.3	8.9	10.7	12.5	12.3	8.5	6.4	6.1	9.2
55 to 64	18.0	19.2	20.4	22.5	26.7	24.2	17.2	10.0	11.4	18.5
65 to 74	29.1	22.4	27.4	27.6	30.9	39.7	31.3	20.9	21.3	27.8

FRANK G. PEDLEY

The Noncarcinogenic Nature of Purified Mineral Oils. Wood, F. C., *J. Am. M. Ass.* **94**: 1641, 1930.

The vogue for mineral oils in the treatment of constipation has given rise to fears of cancer in the minds of physicians and patients. That these fears are not entirely groundless is not to be doubted, for some kinds of mineral oil are notoriously carcinogenic. It is believed by many students of the subject that refined mineral oils are not cancer-producing, but this belief is not unanimous. The scrotal cancers of mule-spinners are believed to be caused by mineral oil which has been refined, but in the case of lubricating oils the refining falls far short of that applied to medicinal mineral oils.

Wood does not believe that there is any

evidence to show that mineral oils such as "nujol" and the like are carcinogenic. Painting the skins of albino mice with therapeutic mineral oils did not produce cancer, nor did these mice develop carcinomas when fed with the oil. The application of heavy lubricating oil to mice of the same strain, however, did produce papillomas and painting with tar produced carcinomas in many instances.

Animal experiments are not as impressive as human experiments, of course. The assumption cannot be entirely accepted that since the life span of mice is so much less than that of man all biological and pathological processes are correspondingly shortened. Human experiments in this matter, however, have been conducted for many years. Petrolatum has long been used as a base for ointments, and liquid petrolatum has been used internally certainly for 15 years. There is no clinical evidence to make one believe that this substance is carcinogenic.

FRANK G. PEDLEY

Obituaries

Dr. Henry Becker, President of the College of Physicians and Surgeons, Toronto, died suddenly on July 23rd, at his summer home at Katrine, Ont.

Dr. Becker, who was 75 years of age, was among the most prominent medical men in Ontario, and his Toronto practice, since he began it thirty-three years ago, had grown to be one of the largest in the city. Prior to that he practised for a short time in Glen Allan and Port Elgin after graduating from the Rockford Academy and Trinity Medical School (1888). He was a native of Hamilton.

Dr. Becker, who was a Swedenborgian in religion and a member of the Church of the New Jerusalem, is survived by his widow, who was Miss Mary Sutherland of Glen Allan, and by three daughters: Mrs. Stanley Beardmore and Mrs. Irving D. Smith of Toronto, and Mrs. W. W. Timmins of Montreal.

Dr. Daniel Dunton. In the passing of Dr. Dunton of Paris, Ontario, on Thursday July 17, 1930, many have lost a true friend and the County of Brant, a good doctor.

Dr. Dunton was born in York County, near Richmond Hill, on February 27, 1859. He obtained his high school education at Weston and his degree in medicine from Victoria College in 1886. For two years he was associated in practice with Dr. Moses Aikins, of Burnhamthorpe. In 1888 he settled in Paris and had enjoyed a very large practice until a few months ago when, through failing health, he found it necessary to give up his work.

In 1889 he married Annie A. Wallis of Etobicoke Township, who survives him, with one daughter and a son, Dr. Austin Dunton, who was in partnership with his father. He was an active member of St. Paul's United Church and for many years, an official of this congregation.

In politics he took an active interest in the Brant County Liberal Association, serving as its president for a number of years. He was several times offered the nomination by his party but his practice would not permit of his acceptance. For many years he rendered valuable service on the Board of Education. He was a member of the Paris Lawn Bowling Club from its formation and greatly enjoyed this sport.

Largely through his efforts the Willett Hospital was built and he was a member of the Board of Governors. He was also a member of the Board of the Brant Sanitarium.

Dr. Dunton was always interested in organized medicine and was a member of both the Brant County Medical Society and the Ontario Medical Association. In the Ontario Medical Association he contributed to the scientific programs at the annual meetings.

The writer has known Dr. Dunton well for over twenty-five years and was proud to call him friend. He was always willing to help his fellow practitioners, and his advice was often sought by the younger men in their difficulties. The medical men of this community have lost a colleague who will be much missed.

WARD WOOLNER

Dr. Francis Strickland Comfort, died at St. Catharines, Ont., on July 24, 1930, in his sixty-ninth year. He is survived by his widow.

Dr. J. W. Lefebvre, of Nicolet, Que., died on August 9, 1930, in Paris, after a severe operation. Dr. Lefebvre was born in 1884, and was educated at the Seminary of Nicolet and Laval University, from the latter institution receiving his doctorate in medicine in 1911.

Dr. James Lindsay died at Limehouse, Ont., on July 25, 1930. He was not in practice.

Dr. E. M. A. Savard. A brilliant medical career came to an end on August 8, 1930, when Dr. E. M. A. Savard, for years inspector-general of the Provincial Health Department and recognized as one of the foremost physicians of the province, died in the Notre Dame Hospital, Montreal. He was in his 63rd year.

The preliminary part of Dr. Savard's education was made in the Quebec Normal School, and later in Laval University, Quebec, where, following a brilliant study, he graduated in medicine in 1895. He started practising in St. Marie de Beauce, where he also occupied the position of coroner for the district.

Then he went to Europe to continue studies, specializing in diseases of the heart, lungs and stomach. He was one of the first in the province to receive the diploma of doctor of public health.

Entering the provincial government service, Dr. Savard became health inspector for the district of Fraserville, and there his genius for organization soon became apparent. The record he achieved in that work led to his nomination as inspector-general of the health service, and the great advance made in health matters throughout the province has been based largely upon his studies and recommendations. For the past 10 years he had made his headquarters in Montreal.

Dr. Savard married first Miss Eva Demers of Quebec; his second marriage was with Miss Eva David, daughter of the late Hon. L. O. David. The surviving children are: Adjutor Savard of the editorial staff of *La Patrie;* Ernest Savard, broker, and Antonio Savard, secretary of the Montreal Baseball Club, and Miss Jacqueline Savard, all of Montreal.

Dr. Frederick Forbes Smith, of Granville Ferry, N.S., passed away on July 17th. Dr. Smith graduated at Jefferson Medical College in 1895. He enjoyed the confidence of a large clientèle, and his genial disposition and sterling qualities endeared him to all the community.

News Items

GREAT BRITAIN

American Surgeons in Edinburgh

A visit of American surgeons, who have been through some of the medical schools of Great Britain and the Continent, was paid to Edinburgh on July 14th, 15th, and 16th. The party included representatives of various surgical schools from New York to San Francisco, and included several Canadian surgeons. The arrangements for a demonstration of surgical work in the Edinburgh Medical School were under the supervision of Professor D. P. D. Wilkie. A series of operations was carried out by the surgical staff in the seven operating theatres of the Royal Infirmary in the forenoon of each day, and demonstrations were given in the afternoons in the department of surgery of the university. These demonstrations consisted of talks of twenty to thirty minutes by various members of the Edinburgh school upon subjects to which they had devoted special attention, such as thoracic surgery, the cause of torticollis, excretion pyelography, post-cricoid carcinoma, precancerous changes in the breast, splenic anæmia, renal reabsorption, and the history of the Edinburgh Medical School. On Wednesday evening, July 16th, a dinner was held in the Hall of the Royal College of Physicians, at which the American guests were entertained by the surgical staff of the Edinburgh school. Emeritus Professor Sir Harold Stiles occupied the chair, and referred to the cordial relations which were growing more and more intimate between surgeons in Britain and those on the American continent. The toast of "The Guests" was acknowledged by Dr. William Darrach, dean of the Columbia University Medical School, New York, who spoke of the preference that existed among American surgeons for the study of British rather than Continental surgery.—*Brit. M. J.*

The Osler Club

The Osler Club celebrated on Saturday, July 12th, the eighty-first anniversary of the birthday of Sir William Osler. Prof. Harvey Cushing, having been welcomed as a "Friend of the Club," gave an informal oration in which the charm and whimsicality of Osler's personality was well brought out. He told of the early Western days, of Father Johnson and of James Bovell, and of how, under their influence, Osler turned from the church to medicine. He also let his audience into the method employed in writing his great life of his friend and master. Dr. Arnold Klebs, Sir Arthur Keith, Sir D'Arcy Power, Dr. Henry Wellcome, and Mr. Philip Franklin then entered on a lively discussion of Osler as physician, author, and man, until Mr. W. R. Bett remembered that it was "long past Osler's bedtime," and wound up the proceedings with a tribute to the influence of Cushing's "Life of Osler" upon the later generations of medical men. Before the oration the club entertained Prof. Cushing to dinner at the Langham Hotel.—*Brit. M. J.* 152, July 26, 1930.

A Tablet to Sir William Osler

On July 13th a tablet in memory of Sir William Osler was unveiled at Ewelme Church by the Bishop of Oxford. As Regius Professor of Medicine in the University of Oxford Osler was Master of the Ewelme Almshouse, and whenever he could find time he loved to visit this secluded and picturesque spot. He had its mouldly old records cleaned, bound, and preserved in a fire-proof safe in the muniment room. The tablet commemorates also Lady Osler and their son Revere.

The Medical Research Council and Gynergen-Sandoz

The attention of the Medical Research Council (Great Britain) has been drawn to a misleading advertisement, involving misuse of their name, which has been given currency on the American Continent in respect of a preparation of ergotamine tartrate known as Gynergen "Sandoz". This advertisement states that "The Pharmaceutical Society of Great Britain, after consultation with the Medical Research Council, adopted Gynergen as the standard for ergot, thus making it the acknowledged leader in this field." This statement is not true.

The Medical Research Council desire to make it plain that they never at any time concurred in, or were consulted about, the adoption of this preparation as a standard. The suggestion made with reference to the Council is therefore entirely without foundation, and any statement implying their approval is a gross misrepresentation.

Further, the current official publications of the Pharmaceutical Society of Great Britain state expressly that for ergot "the standard is a sample of ergotoxine phosphate which is kept in the dark *in vacuo* over phopsphorus pentoxide." The adoption by the Society of this standard, in place of a sample of ergotamine tartrate, was also announced three years ago in a paper by Burn and Ellis, *Pharmaceutical Journal* **118:** 384, 1927, which constituteed a report to the Chairman of the International Conference on the Biological Standardidation of Certain Remedies.

Retirement of Professor Tonks

Professor Tonks has retired from the Slade Chair of Fine Arts in the University of London and the Principalship of the Slade School. He has been Slade Professor and head of the Slade School since 1917, when he succeeded Professor Frederick Brown whose assistant he had been from 1892. Professor Tonks is a member of the medical profession, being an F.R.C.S.

The Lister Memorial Lecture

The Lister Memorial Lecture before the Royal College of Surgeons of England was delivered at the College, Lincoln's Inn Fields, W.C., by Dr. Harvey Cushing, professor of surgery, Harvard Medical School, on Wednesday, July 9th. The subject of the oration was "Neuro-hypophysial mechanisms from a clinical standpoint."

Fourth International Congress for Individual Psychology

The Fourth International Congress for Individual Psychology will be held in Berlin from September 25th to 28th, and will open with an address by Dr. Alfred Adler.

Death by Gas from Grass

Three men who entered a hay-making silo at Manor House Farm near Rugby were killed by carbon dioxide fumes set up by the fermentation of cut grass

in the silo, a large tank standing about 50 to 60 ft. high on girders.

Royal College of Physicians, Edinburgh

A quarterly meeting of the Royal College of Physicians of Edinburgh was held on July 15th, with the President, Sir Norman Walker, in the chair.

Lt.-Col. W. F. Harvey, C.I.E. (Edinburgh) and Dr. Arthur Oliver Gray (London) were introduced and took their seats as Fellows of the College.

Dr. H. L. Wallace (Edinburgh), Dr. Wm. Brown, O.B.E. (Aberdeen) and Dr. H. E. Whittingham (Halton, Bucks) were elected Fellows of the College.

It was announced that Dr. D. K. Henderson (Glasgow) had been appointed Norison Lecturer for 1931.

ALBERTA

For some time it has been rumoured that the Provincial Department of Health contemplated unifying the work in the three mental hospitals by the appointment of a specialist, who, conversant with the work, would so correlate it as to get the best results for all types of cases. It has now been announced, that Dr. C. A. Baragar, of the Brandon Mental Hospital, has been appointed as supervisor. Dr. Baragar graduated from Manitoba University fifteen years ago.

Very interesting clinics and lectures were given in Edmonton on July 15th by Professor George Wilson and Dr. Kenneth MacKenzie, of Toronto University. Though the weather was intensely warm, and the Edmonton Fair was in progress, more than sixty-five physicians were in attendance.

It has been announced that the Rockefeller Foundation is sending an organizer to help in the establishment of two medical health centres in Alberta, one at Red Deer and another at High River. Legislation was passed providing for this measure two years ago, but up to the present time, there has been hesitancy in carrying this out owing to the future expense which it will entail. The Rockefeller Foundation and the Provincial Government will share the cost estimated at ten thousand dollars for the first three years. After this period it is uncertain where the necessary funds will come from. This is what has lessened enthusiasm in the project up to the present time.

The question of indigent patients has become acute this year, following as it does a poor-crop year. Municipal hospitals, or any other hospitals for that matter, can collect from other municipalities an amount up to two hundred dollars for the care of an indigent patient, a resident of an outside municipality. Living for three months in a locality constitutes residence. On this account, many municipalities are saddled with the expense of keeping tuberculous patients in the sanatorium, when they could not prevent the incoming of the indigents already well advanced with tuberculous infection.

There are about twenty-five rural municipal hospitals and those in charge are feeling that it is an imposition to have indigent sick sent to them by other municipalities without hospital provision, only part of whose accounts can be collected, also other indigent sick who have not resided in any municipality long enough to constitute residence. There are thousands of dollars due the municipal and other hospitals. The Provincial Government has been asked to relieve this situation.

The College of Physicians and Surgeons of Alberta recently made a grant of $500.00 to the Medical Library fund of Alberta University, on condition that the University spend a like sum. As a matter of fact, the University has invested a very considerable sum, and is continuing to expand the library. Their library is available to every member of the medical profession in Alberta free of charge, and it is hoped by the Council of the College of Physicians and Surgeons and by the Medical Department of the University that greater use will be made of it in the future than in the past.

It has been gratifying to the College of Physicians and Surgeons of Alberta to be informed that 99 per cent of their members have been obeying the Alberta Liquor Law both in spirit and in letter in the matter of issuing liquor prescriptions for medical purposes only.

The following are recent registrations in Alberta, according to the Registrar of the College of Physicians and Surgeons:— Drs. F. H. Wheeler, Calgary; A. M. White, Shumacher, Ont.; G. G. Brearly, Oliver; L. M. Mullen, Robertson; K. A. Hamilton, Moose Jaw, Sask.; C. B. Wright, Calgary; C. G. S. Baronsfeather, Edmonton.

The Medical Faculty of the University of Alberta is to be congratulated on the fact that every final year medical student graduated, and each one took the Dominion Medical Council examinations and was successful. Alberta medical students are eligible for registration in Alberta without further examination, after they have passed the final examinations. It is significant that all should have passed the Dominion Council examinations.

With an expenditure of $155,699.16 at the Calgary Municipal hospitals for the first six months of 1930 and revenue amounting to $93,898.05, the charge to the mil-rate during the first half of the year will be $61,801.11, compared with a charge of $42,897. 65 for the same period of 1929. During the first six months of 1929, expenditures at the Calgary municipal hospitals totalled $153,563.87 and revenue was placed at $115,666.22. In June, 1930, $24,802.67 was spent at the three hospitals operated by the city compared with an expenditure of $25,413.07 in June, 1929. Revenue last month amounted to $15,533.95 while in June of 1929 the amount collected was in fees and grants $18,080.15. The charge against the mill-rate for June, 1930, was $9,368.72 and in June, 1929, it was $7,332.92.

Acute anterior poliomyelitis has once more made an appearance in Calgary. Owing to a shortage of convalescent serum for use in this disease steps will be taken, according to the Hon. George Hoadley, to increase the supply. The question of keeping supplies of this serum at other centres than Edmonton has been considered before and will again be taken up, but there are serious difficulties in the way of making the serum as generally accessible as might otherwise be desirable.

The proposed Coronation-Veteran Municipal Hospital District is slowly acquiring a concrete shape. The Provincial Board which was formed has submitted a scheme to the Minister of Health, which in part

provides for the building of a hospital at Coronation and a sub-hospital at Veteran, also providing for the taking over and operating of the present Coronation Hospital, paying the town of Coronation $13,500.00 for the structure. The proposed scheme is being advertised throughout the district for a short time, and, when all other preliminaries are complied with to the satisfaction of the Minister of Health, a date will be set for taking a poll for the rejection or ratification of the scheme. The estimated revenue is $33,074.91 and estimated expenditures $25,850.00, leaving a surplus of $7,224.91. Taxation will amount to $22,824.91, the town of Coronation being taxed $3,808.00 and Veteran $1,071.00, while the municipal districts involved provide the balance. The present Coronation Hospital is paid up and costs the ratepayers nothing in the way of up-keep, but it is not large enough for the surrounding district.

A meeting of the Central Alberta Medical Association was held at the Coronation Hospital on July 18th at which physicians from Clive to the Saskatchewan boundary and from Youngstown to Hardisty were present. Subjects of medical and surgical interest were discussed. Dr. C. A. Staples, of Stettler, presided.

The Brett Sanitarium at Banff, founded many years ago by the late Hon. Dr. R. G. Brett, was formally opened on July 14th as the Banff General Hospital under the management of the Sisters of St. Martha, who purchased this well known institution. The sanitarium was closed for some time following the death of the Hon. Dr. Brett. It was then sold to the present owners who made a thorough renovation of the building.

The Sisters of St. Martha founded their first hospital at Antigonish, Nova Scotia, some years ago, which at first accommodated only a few patients. At the present time they have 125 beds, also several rural schools and orphanages in the Maritime Provinces. They have a small hospital at Lethbridge which they intend to enlarge so as to accommodate 100 patients.

The official opening of the Banff General Hospital was attended by a large number of people. Addresses were given by Dr. G. M. Atkin, who reviewed the life and work of the Hon. Dr. R. G. Brett who settled in Banff in 1886, and a little later built the sanitarium which bore his name. Dr. Brett died on September 16, 1929. Dr. J. D. Robinson spoke about the healing qualities of the hot sulphur springs with which nature had blessed the district, and the value of which Dr. Brett had early recognized. Bishop Kidd, of Calgary, emphasized the fact that all hospitals operated by the Sisters of St. Martha were open not only to the medical services of all doctors but to the spiritual ministrations of ministers of all denominations.

Dr. G. D. Stanley formerly a member of the Provincial Legislature for High River, was elected to represent East Calgary in the recent federal election.

G. E. LEARMONTH

BRITISH COLUMBIA

It is announced that a thorough investigation of the whole question of drugless healing will be undertaken by the provincial government. This was foreshadowed at the last session of the House and it is hoped that the findings will be ready when the Legislature reopens in the autumn.

Steps are being taken by a group of ladies in Penticton to form a Cancer Research Society. The aims of the society as outlined are the raising of funds to assist the Cancer Research Committee of the British Columbia Medical Association. Efforts will be directed towards providing facilities for treatment, and it is hoped that eventually actual research can be undertaken.

Under a recent amendment to the Medical Act, the use of the title "Doctor" by other than qualified persons was made illegal. Recently the first conviction under the clause was secured in the courts.

Dr. F. C. Bell, who has been seriously ill, has resigned as Medical Superintendent of the Vancouver General Hospital. Applications are being received by the hospital to fill the vacancy.

C. H. BASTIN

NEW BRUNSWICK

Drs. J. A. Nutter and H. Segal, of McGill University, were the speakers for the July extra-mural meetings in New Brunswick. They spoke at meetings in Woodstock, Fredericton, Saint John, Moncton and Bathurst. The attendance at all meetings was good.

Dr. Nutter received a special welcome as his first visit inaugurated the extra-mural courses in New Brunswick. His topic was "Arthritis", and his practical remarks on this subject were immediately applicable in every day practice. His subject was interestingly illustrated by lantern slides.

Dr. Segal, as a newcomer and a stranger to most of us, proved to be a pleasant and gifted lecturer. His subject was "Auscultation" and he developed the theme clearly with special reference to the extreme care necessary for accurate listening to the heart sounds. By blackboard sketches and graphs, the subject was made more clear to those of us whose physiological training is becoming rather remote. This team of speakers formed, in the writer's estimation, almost an ideal combination, in that Dr. Nutter spoke in a most practical way as a clinician in a specialty where his experience has been so wide, while Dr. Segal brought an enthusiastic message along the lines of research or theoretical medicine, with illuminating touches of historical interest. Addresses like these are helpful in every-day work and a stimulation to reading and sustained interest. We hope to hear both gentlemen again.

Dr. S. H. McDonald has resigned from the Board of Commissioners of the Saint John Tuberculosis Hospital. Dr. McDonald has been a member of this board from the time of construction of the hospital, when its future was problematical. Through many years he has aided its advancement by a very remarkable regard for his civic and professional duty. He was the spokesman on the board for medical opinion, and his services throughout have been of exceptional benefit to the profession at large as well as to those suffering from tuberculosis. The vacancy caused by this resignation has been filled by the appointment of Judge John Barry.

At the annual meeting of the Moncton Hospital Board, the six retiring members were re-elected. Miss MacMaster and a special committee were appointed to purchase new furnishings for the new buildings. Twenty city doctors have applied for positions on the staff.

Dr. J. R. Nugent and Dr. R. M. Pendrigh of Saint John, sailed for Europe the last of July. It is their intention to study for three months at Edinburgh.

Dr. R. J. Collins, formerly superintendent of River Glade Sanatorium, was formally welcomed by the Commissioners of the Saint John Tuberculosis Hospital on June 10th. He succeeds Dr. H. A. Farris as superintendent at Saint John. Under his direction the beautifying of the grounds and further building to accommodate the increased staff is going forward. A bond issue of $15,000.00 has been approved to finance these changes.

Dr. P. M. Knox, for the last four years assistant to the superintendent at the Saint John Tuberculosis Hospital, has taken up his new duties as Superintendent of the Jordan Memorial Sanatorium at River Glade, N.B.

Eight nurses graduated from the Soldiers' Memorial Hospital at Campbellton this year. At the annual exercises, Dr. D. Murray, of Campbellton, gave the address to the nurses.

Dr. J. A. M. Bell, of Newcastle, delivered the address to the nurses at their graduation from the Miramichi Hospital, and Dr. F. G. Wilson, of Red Bank, presented the diplomas.

Dr. G. G. Corbet has resigned his position as medical adviser to the Workmen's Compensation Board of New Brunswick. He held this position for eleven years. Dr. Corbet intends to devote his full time to his practice and surgery. Dr. Corbet was the recipient of a farewell presentation from the staff of the Compensation Board just prior to his leaving to attend the military camp at Sussex.

A. STANLEY KIRKLAND

NOVA SCOTIA

The Board of Governors of Dalhousie University have announced that Miss Anna MacKeen has been appointed Warden of Shireff Hall, a position vacated by the appointment of Miss Margaret Lowe as Principal of Bishop Strachan School in Toronto. Miss MacKeen is a graduate in Arts of McGill University and has had a splendid Executive training for a number of years. She is a Nova Scotian, a member of a well known family, a daughter of the late Dr. R. A. H. MacKeen of Glace Bay and a sister of Dr. R. A. H. MacKeen of the medical staff of Dalhousie. Associated with her as Deputy Warden will be Miss Marion I. Clarke, B.A., R.N., daughter of Rev. J. A. Clark, the revered pastor of St. Matthew's Church, Halifax.

A four-storey addition to the Hamilton Memorial Hospital, North Sydney, has recently been completed. The addition, which measures 98 by 40 feet, provides for several new public and private wards and also for better accommodation for the operating-rooms, x-ray rooms, and other features of a modern hospital.

The eighteenth annual meeting of the Canadian Pharmaceutical Association was held at Halifax from August 4th to 8th. There was a large attendance from the several provinces. Many of the members from a distance came via Digby in order to participate in the ceremonies associated with the unveiling of a memorial to Louis Hebert at Annapolis Royal, on August 2nd. The tablet bears the following inscription: "To honour the memory of Louis Hebert, pioneer apothecary in Canada, 1604, this tablet is placed here by the Nova Scotia Pharmaceutical Society, A.D. 1930."

The federal election campaign brought forth plentiful evidence that Bluenose physicians continue to be keenly interested in politics. While only two physicians were nominated as candidates—Drs. L. W. Johnstone, of Sydney Mines, and J. A. MacDonald, of St. Peters, both members of the last parliament, and both successful in the recent contest, a large number took a prominent part in speaking, broadcasting, and other activities. Dr. W. N. Rehfuss, of Bridgewater, who is never happier than when in the thick of a political contest, was unfortunately compelled to abandon the fray and enter the Victoria General Hospital for treatment. It is gratifying to learn that he is now making a good recovery from a very serious illness.

Dr. J. A. Doull (Dalhousie, 1914) now Associate Professor of Epidemiology at the Johns Hopkins University, has been appointed Professor of Hygiene and Public Health at the Western Reserve University, Cleveland, in succession to Dr. R. G. Perkins. Dr. Doull is a native of New Glasgow. He served with the R.A.M.C. during the war, receiving the Military Cross, and the Croix de Guerre in recognition of his services. After demobilization he obtained the D.P.H. of Cambridge, and on returning home was associated with the Provincial Department of Health for a year. He then spent two years at the Johns Hopkins School of Hygiene, where he obtained the Dr. P.H., and was appointed Associate in Epidemiology. In 1926 he was "loaned" to the University of Rio Janeiro, and on his return to the Johns Hopkins School was given the rank of Associate Professor of Epidemiology. Since 1928 he has been in charge of the research on the "Common Cold" which is being carried out under the John J. Abel Fund.

Dr. J. C. Acker has been appointed to the visiting staff of the Dalhousie Public Health Clinic.

Dr. Clyde W. Holland, of the Dalhousie faculty, has returned from a year's leave of absence in which he was engaged in graduate studies.

All of the graduates of the Dalhousie Medical School who wrote the June examinations of the Medical Council of Canada were successful and are now licentiates of the Council.

A substantial sum of money has been raised by interested friends to be expended in beautifying the grounds of the West Kings Memorial Hospital, Berwick.

Many physicians of Nova Scotian birth, who have located in other provinces or in the United States or elsewhere, have come back to visit their native province this summer.

The Portuguese naval transport *Gil Eames*, at present serving as hospital ship to fishermen of Portugal who come to the fishing banks of the North Atlantic, spent several days in Halifax Harbour during July.

Dr. and Mrs. W. H. Rehfuss, of Bridgewater, motored to Toronto to attend the closing of Toronto University, June 6th, the special attraction being the graduation of their daughter, Miss Margaret. En route Mrs. Rehfuss attended the annual meeting of the National Chapter of the I.O.D.E. in Montreal.

Dr. Nat McDonald, Sydney Mines, accompanied by his wife and family, spent most of August at the Artillery Meet at Petawawa, going and coming by motor. He will be command of the 36th Battery. We regret to learn they had quite a serious motor accident just before reaching their destination.

QUEBEC

The City of Montreal has opened 36 vaccination bureaux for immunization against smallpox. This vaccination is compulsory and no child will be admitted to a public school who has not a certificate attesting to the fact that he has been vaccinated.

The following is contained in the official bulletin:

"The public in general and parents in particular are requested to take notice that from Monday, August 4, until the first day of September, 36 clinics for vaccination against smallpox located in the different districts of this City, will be opened by the Department of Health.

"Vaccination against smallpox is compulsory for all citizens, in compliance with the provincial and municipal by-laws. Unfortunately, too many individuals omit this obligation."

The Survey of Nursing

The survey of nursing education which is being made throughout Canada has now reached Quebec and Dr. G. M. Weir, who is in charge of the work, was in Montreal during the early part of August preparing the groundwork for the local study.

The proposed study is carried on under the ægis of the Canadian Medical and Canadian Nursing Associations with a view to establishing, on a solid basis, questions of organized control, minimum educational and professional qualifications, curricula and examination standards. Educational problems, such as the relative amounts of theory and practice required by nurses, more bedside nursing practice while in training, and many other similar matters are also being studied. There are many different opinions on these matters, but no accurate studies have ever been made.

Universities throughout the Dominion are co-operating in the work. In Montreal, McGill University and the University of Montreal are taking an interest in the study and questionnaires will be distributed.

The prime consideration is the supplying of adequate nursing services to the community without sacrificing the interests of the nursing and medical professions and of the hospitals involved. The survey is bristling with problems of an economic, educational, and social nature, which can never be solved without a knowledge of the facts and factors involved. The nursing and medical professions and various organizations in the different provinces visited have given their whole-hearted co-operation and similar support is expected in eastern Canada.

The committees of the Canadian Medical and Canadian Nurses Associations are represented by Dr. G. Stewart Cameron, Peterborough, Ont., Prof. Duncan Graham, Toronto University; Professor A. T. Bazin, McGill University; Miss Jean Gunn, Superintendent of Nurses, Toronto General Hospital; Miss Kathleen Russell, Professor of Nursing, Toronto University, and Miss Jean Browne, director of the Junior Red Cross.

Seven of the 18 governors of the College of Physicians and Surgeons of the Province of Quebec were elected by acclamation for the next four-year term, according to an announcement made recently by Dr. J. Gaugreau, Secretary of the College. In the remaining 11 districts elections will be held, there being two nominees for the post in each territory.

The following were elected by acclamation: District No. 2, Dr. Alphonse Dion, L'Islet; District No. 4, Dr. Leo Blais, Lake Megantic; District No. 7, Dr. Arthur Brassard, Valleyfield; District No. 12, Dr. J. A. Jasmain, Montreal; District No. 14, Dr. J. P. Laporte, Joliette; District No. 16, Dr. J. C. Dagneau, Quebec, and District No. 18, Dr. H. D. Brassard, Roberval.

SASKATCHEWAN

Dr. W. H. Pedley, of Admiral, Sask., addressed the Regina and District Medical Association after a dinner at the Kitchener Hotel on July 9. His subject was "Compulsory health insurance."

Dr. Urban Gareau, of Regina, addressed the Battleford Medical Society on July 30. His subject was "Focal infections in infants and children."

The following appointments to provincial mental hospitals have been made: Drs. Foster Murray, formerly of Athabasca, Alberta, and H. G. Cameron, formerly interne at the Regina General Hospital, to North Battleford Hospital; Alice Mooney Wells, to Weyburn Hospital.

A "One Day Rest in Seven Act" passed the last session of the Saskatchewan Legislature. If this had been enforced nurses in the hospitals would have been penalized $25 a week and the hospitals of the city a similiar amount for working portions of each day of the week instead of taking a full twenty-four rest each week. In the Regina General Hospital there were 129 members of the lay staff of the hospital who work part of each day; they work a portion of each Sunday and get half a day off during the week to compensate them for the time worked on Sunday. A committee consisting of Ald. W. W. Champ, chairman of the Hospital Board, Ald. E. B. McInnis and Dr. S. R. D. Hewitt, superintendent of the hospital awaited on the Minister of Labour and asked that the Act be not enforced in regard to hospitals. Their request was granted.

LILLIAN A. CHASE

UNITED STATES

Garvan Cancer Research Laboratory of the Surgical Pathological Laboratory of the Johns Hopkins University

There will be a meeting in the ballroom of Belvedere Hotel in Baltimore, Maryland, Monday, Tuesday and Wednesday, September 15, 16 and 17, 1930, beginning on Monday morning at ten o'clock and ending Wednesday evening at nine o'clock, daylight saving time. During these days there will be lantern-slide demonstrations, with four lanterns and screens, on the Diagnosis and Treatment of Diseases and tumours of Bone.

The first day will be devoted to the fundamental and essential knowledge of the benign and malignant lesions of bone, such as osteitis fibrosa, giant-cell tumours, osteomyelitis, sarcoma and so forth. On the second day, the subject will be the different diseases of single bones, such as the lower end of the radius, vertebræ, etc. The third day will be reserved for the presentation of rare lesions of bone difficult to diagnose. Any member of the medical profession attending this meeting may register such a case by addressing Miss Maude Walker, Secretary to Dr. Bloodgood, Surgical Pathological Laboratory, Johns Hopkins Hospital, Baltimore, Md., enclosing the x-ray films or lantern slides of them (if possible the latter), and sections of tissue, if any. Any member of the medical profession interested in the diagnosis and treatment of lesions of bone is invited.

On account of the size of the ballroom the number must be limited to 800.

Those who wish to attend should write the Belvedere Hotel and register, either requesting the usual rates for a single or double room with and without bath, or the special rates for three or more in a room with or without bath, and the special restaurant rates for a club breakfast, luncheon and dinner. You are advised to bring the answer received from the manager of the Belvedere Hotel with you and present it when you register. For any further details in regard to this demonstration, address your letter to Miss Maude Walker.

I am very anxious that this invitation should reach radiologists, surgeons, pathologists, and internists who are interested in the subject but have only rare opportunities to observe lesions of bone. In three sessions of two or two and one-half hours each, on three days, with four lanterns and a very remarkable and educational motion picture, the subject can be presented in an almost unforgetable way, emphasizing the essentials and fundamentals in the diagnosis and treatment of bone lesions. All cases registered for presentation on Wednesday, will be sent later to Dr. Bowman C. Crowell, Director of Clinical Research of the American College of Surgeons, who is Chairman of the Bone Sarcoma Committee. You should become familiar with this registration of sarcoma of bone, if you are not, because you can register all your cases there and receive the diagnosis of a committee, and you can send for groups of bone tumour cases which have been registered, for personal study.

JOSEPH C. BLOODGOOD

The Symposium on the Kidney in Health and Disease University of Minnesota, July 7-18, 1930

Post-graduate medical education in America or, indeed, elsewhere, has seldom been undertaken in a manner comparable with the teaching in other faculties of a graduate school. Though often of high grade the courses offered have frequently been hampered by mundane considerations of cost, time, etc. The necessity for concentrating upon details of immediate practical value to the physician has often proved a barrier to presenting those phases in proper relationship to modern developments in the fundamental sciences as well as present day clinical and laboratory investigations upon disease. The University of Minnesota has decided to devote annually a portion of its funds for university extension work to the support of a course in some subject of particular interest, not necessarily confined to medicine. To Dr. Berglund, Professor of Medicine, belongs the credit for initiating and organizing a post-graduate course of somewhat novel character.

A number of the members of the Minnesota Medical Faculty are well known for their investigations on the kidney. With this group as a nucleus, the university invited the co-operation of numerous authorities, both from this continent and Europe, in staging a two weeks' symposium on the kidney from all aspects likely to throw light on its normal function, its behaviour in disease, and on suitable methods for diagnosis and treatment of renal disease.

In the final program were included such men as the well known experts on kidney diseases: Professor Volhard, of Frankfort-on-the-Main, Professor Snapper, of Amsterdam, and Dr. Rehberg of the Zoophysiological Laboratory of Copenhagen. From this continent came Professors Longcope, Marshall, Huber, Carlson, Bell, Richards, Scammon, Gamble, White, Robinson, Wagener, Rowntree, Welker, Keith, Fahr, and many others, to discuss phases of the subject of particular interest to them. The attendance was approximately 300, including not only anatomists, physiologists, and pathologists, but also many of the best known internists of the country.

During the first week physics and physical chemistry, anatomy, comparative anatomy, embryology and pathology, immunology and nutritional investigations were laid under contribution. In the second week the papers were predominantly clinical in nature. In addition to their other contributions to the symposium several clinics on patients from various hospitals in the city were given by Professors Volhard, Longcope, Snapper and Fahr. These were easily the most appreciated part of the program. Of equal importance, however, to the clinician and investigator were a series of six round-table discussions on various divisions of the subject wherein questions were answered and opposing viewpoints made clear. The University Librarian arranged an exhibit of rare and important works on the kidney. Demonstrations of the anatomy, comparative anatomy and pathology of the kidney also elicited much interest.

While the work of the symposium continued from 9.00 a.m. to 4.00 p.m. with several evening sessions, social and recreational features were also provided in the form of receptions, dinners, golf, etc., and an adjournment over the week-end to the north of Lake Superior afforded a respite from Minneapolis summer weather. Many also embraced the opportunity to see "Bobby" Jones win the National Open Golf Championship.

Medical symposia of sufficient duration to discuss adequately the problems of a particular system or organ have not previously been held in America. Surpassing, as it did, the expectations of the most sanguine the Minnesota Kidney Symposium will without doubt exercise an important influence on the teaching of renal disease in the medical schools of this continent.

WALTER R. CAMPBELL WALTER DEM. SCRIVER

Typhoid Fever in the United States

According to the *Journal of the American Medical Association* the typhoid incidence and mortality in the

United States continue to decline. Not only was the typhoid death rate for 1929 in a city population of approximately 34 millions as low as 1.56 per 100,000, but the actual number of typhoid deaths in this population was lower than half the corresponding number in 1925. The number of diphtheria deaths reported in 1929 (2,698 for 81 cities with a population of about 34 millions) was also considerably lower than it has been for some years.

At the recent meeting of the American Association for the Study of Goitre at Seattle, Washington, Dr. William F. Rienhoff, Jr., of Johns Hopkins University, Baltimore, Maryland, received the annual award of $300 for the best essay dealing with the goitre problem. Drs. O. P. Kimball, of Cleveland, Ohio, and E. P. and D. R. McCullagh, Cleveland Clinic Foundation, Cleveland, Ohio, and Robert P. Ball, of the University of Louisville, received honourable mention.

GENERAL

Inter-State Post-Graduate Medical Association of North America

This association is to meet this year in Minneapolis, Minn., from October 20th to October 24th, inclusive.

A very attractive program has been arranged. Among well known clinicians, the following will take part: Drs. Hugh Cabot, J. O. Polak, D. C. Balfour, J. B. DeLee, H. A. Christain, J. W. Williams, H. P. Mosher, E. W. Ochsner, H. H. Brooks, T. W. Todd, C. H. Mayo, E. P. Joslin, J. B. Deaver, D. D. Lewis, W. A. White, B. J. Lee, F. H. Lahey, E. Libman, C. A. Elliott, J. H. Musser, E. S. Judd, H. Fox, G. W. Crile, L. G. Rowntree, A. D. Bevan, W. J. Mayo, and W. J. Kerr, besides numerous others.

Prof. Ferdinand Sanerbruch, of the Department of Surgery, Berlin University, and Prof. Emil de Grosz, Department of Ophthalmology, University of Budapest, have accepted invitations to be present, and Mr. Henry Wade, F.R.C.S., of Edinburgh University.

Among Canadians taking part we note the names of Drs. A. T. Bazin, R. D. Rudolf, Alan G. Brown, A. H. Gordon, F. B. Gurd, W. G. Turner and F. N. G. Starr.

Executive Committee, China Medical Association

The attention of the Executive Committee of the China Medical Association having been called to the published report:—

"League of Nations Health Organization,"
proposals of the National Government of the Republic of China for
collaboration with the League of Nations on health matters

would express its hearty appreciation of all efforts on the part of the League of Nations to bring its varied experience to the help of the Government of China in the solution of the many medical problems that have to be faced at the present time and of the personal efforts of Dr. Rajchman to this end. But it is of essential importance that facts recorded in such reports should be strictly correct, and unfortunately the information that Dr. Rajchman has received and published here in reference to the mission hospitals and the medical colleges approved by this Association is far otherwise.

We are not aware from what sources Dr. Rajchman received his information as to the present state of the mission hospitals. This was apparently obtained at second hand from someone with little knowledge of the facts of the case.

The Committee desires to call particular attention to the following statements:—

On page 10: "Since 1920, a number of hospitals have undoubtedly been constructed, but a much larger number have been closed. For instance, the *China Year-Book* for 1929-30 is authority for the statement that, in 1927, 33.3 per cent of the missionary hospitals in the south had been closed."

As a matter of fact there was a steady if small increase in the number of hospitals up to 1927. During the period immediately following that a large number had to be closed or were destroyed during the troubles. In the last two years all these except six have been re-opened and hospital work has been begun in several new centres. Further, in a considerable number of hospitals Chinese doctors have of recent years assumed responsible positions, in many cases filling the post of hospital superintendent.

The most serious misstatement, however, appears on page 26 where it is said that "the bulk of the missionary hospitals, particularly the smaller institutions, do not seem to have progressed much beyond the level reached ten years ago, when the China Medical Missionary Association issued (in 1920) the results of the "Enquiry into the efficiency of missionary hospitals in China."

Dr. Rajchman then goes on to quote a summary of this report as follows (page 26):—

"Thus it was shown that:—

34 per cent of the hospitals from which reports were received had no nurse whatever, either foreign or Chinese: 60 per cent not more than one trained nurse: 37 per cent depended entirely on the patients' friends for all nursing, while 62 per cent had no night-nurse.

37 per cent possessed no bedding, or only sufficient for a very few patients.

58 per cent were unable to clothe their patients in clean hospital garments.

8 per cent only had a pure water supply, and 6 per cent only had running water laid on throughout the hospital.

50 per cent seldom or never bathed their patients, and 43 per cent had no laundries, or only inadequate accommodation for dealing with the hospital linen.

34 per cent did not possess a steriliser for dressings, and 73 per cent had no means of sterilising bedding or mattresses.

37 per cent had no protection whatever against flies or mosquitoes and 65 per cent had no isolation block or courtyard.

31 per cent did not possess a laboratory of any kind, while 82 per cent had no bacteriological incubator.

87 per cent did not possess an x-ray apparatus."

This report was published, as stated, by the China Medical Missionary Association (now the China Medical Association) in 1920. The figures given are entirely inaccurate however if made to refer, as is here done, to the same hospitals ten years later. The first of these statements can be tested by figures just to hand for 1930 from 212 hospitals all over the country, and these show that: 4.7 per cent have no nurse whatever (in place of 34 per cent in 1920); 8.5 per cent have not more than one trained nurse (in place of 60 per cent in 1920); 3.7 per cent depend on orderlies very partially trained, and 1 per cent entirely on patients' friends (in place of 37 per cent in 1920 depending entirely on patients' friends).

With regard to other items in the list, except the last, we have no figures to give, but we believe, as almost necessarily would be the case, that improvements here

WANTED—Assistantship with a general practitioner or specialist in Ontario, preferably in Toronto or vicinity, by a recent graduate, M.D., C.M., L.M.C.C. References forwarded on request. Apply Box 132, C.M.A.J., 3640 University St., Montreal.

ANÆSTHETIST—Wanted recent graduate (male) preferably with hospital interneship experience to undergo training in general anæsthesia in large hospital. Full maintenance and reasonable salary for first year, after which permanent arrangement may be made. Apply Box 133, C.M.A.J., 3640 University St., Montreal.

WANTED—Radiologist desires association with hospital or clinic group. Good training and experience in x-ray diagnosis, x-ray and radium therapy. L.M.C.C. Apply box 134, C.M.A.J., 3640 University St., Montreal.

WANTED—Interne for 50 bed Standardized General Hospital in New Brunswick. Apply with references to The Soldiers Memorial Hospital, Campbellton, N.B.

APPLICATIONS FOR THE POSITION OF GENERAL SUPERINTENDENT—Applications for the position of General Superintendent of Vancouver General Hospital, Vancouver, British Columbia, will be received at once by the undersigned. Applicants, who must be graduates of an approved Medical College, shall give their age, nationality, year of graduation, experience, and salary expected. Any further information may be obtained from George Haddon, Secretary, Vancouver General Hospital, Vancouver, B.C.

AZNOE'S AVAILABLE CANADIAN PHYSICIANS. — (A) M.D., Toronto University, age 29; 2 years' internship, four years' general practice, one year surgical residency, desires surgical assistantship; salary open. (B) M.D., Toronto University, age 29; rotating internship, some general practice, 4 months assistant in tuberculosis institution desires tuberculosis or industrial position; if maintenance, must include wife. No. 3238, Aznoe's National Physicians Exchange, 30 North Michigan, Chicago.

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have followed *pari passu* with the phenomenal increase in the nursing services.

As regards the last item, that relating to x-ray apparatus, the facts in 1930 are that 55 per cent of the hospitals are without such apparatus, in place of 87 per cent in 1920.

On page 28 of the League of Nations' report a list is given of medical schools approved by the China Medical Association in 1926 as follows:—

"At present the only school in China up to this standard is the Peiping Union Medical College. The schools holding registration are those of Mukden, Tsinan, Chengtu, and the Women's and Mission Colleges in Shanghai. The Hsiang Ya School at Changsha was provisionally registered before the break-up, and also the Hangchow Missionary Medical School, since closed.

In 1925-26 there were eight schools. These were:—

Organised as a School of a University:

Tsinan, Shantung Christian Missionary School of Medicine

Shanghai: St. John's University School of Medicine.

Szechuen: West China Mission University Faculty of Medicine.

Separate Medical Colleges up to Full Medical College Standards:

Peiping: Women's Christian Medical College

Hsiang-ya: College of Medicine.

Separate Medical Colleges of College Grade, but not up to Medical College Standards:

Mukden Medical College

Hangchow Medical Training College

Hackett Women's Medical College."

The list here given is incorrect. The correct list (omitting the headings given by Dr. Rajchman) should read as follows:—

Full Recognition:

Union Medical College, Peking. January, 1925.

Provisional Recognition:

Moukden Medical College, Moudken. January, 1925.

Pennsylvania Medical School of St. John's University, Shanghai. January, 1925.

Women's Christian Medical College, Shanghai. January, 1925.

Medical School of the West China Union University, Chengtu. January, 1925.

Medical School of the Shantung Christian University Tsinan. January, 1925.

Hunan Yale Medical School, Changsha. January, 1925.

Hangchow Medical College, Hangchow. November, 1926.

The Committee regrets the necessity for publishing a protest in connection with this effort to assist in the solution of some of the medical problems of China but it feels, in justice to the hospitals and medical schools, which in its position as Executive Committee of the China Medical Association it represents, that it can do nothing less.—Abstracted from *The China Medical Journal* **44**: 579, June, 1930.

A New Departure in Medical Education

A "Haus für ärtzliche Fortbildung" has been recently opened in Essen, Germany, under the auspices of the medical societies of the west German industrial region, the medical faculties of the Universities of Cologne, Bonn, and Münster, the Düsseldorf Medical Academy, and the City of Essen. Special courses will be given to general practitioners, who will also have an opportunity of observing and examining cases of all kinds at the bedside. This will be of special advantage to those medical men who have no hospital affiliations.

A Martyr to Science

The Cross of the Legion of Honour has been conferred on Dr. Jean Chabry, whose experimental work in radiology has resulted in an attack of radiodermatitis, necessitating the amputation of his right arm and part of the collar-bone. The Cross was presented to him by M. Ferry, Minister of Public Health, at his bedside in a hospital at Neuilly.

Book Reviews

Surgical Diagnosis. By 42 Authors, edited by Evarts A. Graham, Professor of Surgery, Washington University Medical School, St. Louis. 3 volumes and separate index. 2,800 pages, 1,200 illustrations. Per set, $38.50. London and Philadelphia, W. B. Saunders Co.; Toronto, McAinsh & Co. Ltd., 1930.

This work on surgical diagnosis is made up of four volumes, three on the subject proper and one on index. The editor, Dr. Evarts A. Graham, and the various contributors need no introduction to the profession at large, all being men of proved ability and wide experience.

The plan of the work is excellent, each surgical condition being discussed from the standpoint of etiology, pathology, symptomatology and differential diagnosis. One feature requiring special mention is the very definite attempt at being explicit regarding methods of examination and interpretation of findings. This feature is much in evidence in all the volumes, but particularly in volume three.

About the only criticism which might be offered is that more space was not allotted to the discussion of differential diagnosis. It is true that differential diagnosis is discussed at length in some of the sections, but, considering the work as a whole, the lack of this discussion is noticeable. Here and there, too, one sees a short chapter on prognosis and treatment, which are unusual features in a book on surgical diagnosis.

The volumes are well bound and printed in a very readable manner, the illustrations being excellent. Each volume averages, approximately, 900 pages. On the whole the books represent, possibly, one of the best efforts to place before the profession a work on surgical diagnosis, and any physician or surgeon who wants to have on hand a dependable reference work, will do well to have this set in his library.

Taylor's Practice of Medicine. E. P. Poulton, M.A., M.D., F.R.C.P., C. P. Symonds, H. W. Barber and R. D. Gillespie. Fourteenth edition. 1075 pages with 64 plates and 103 text figures. Price 25/. J. & A. Churchill, London, 1930.

Sir Frederick Taylor's Practice of Medicine has gone through fourteen editions since 1890. Since the eleventh edition this popular work has been carried on by E. P. Poulton, who has kept it up to date. He has the active collaboration of several outstanding specialists in the writing of portions of the book. There is a valuable and well illustrated section on diseases of the skin which many books on practice do not include. Tropical diseases appear in one section, as do the diseases associated with the parasitic worms. Comparing this with the previous edition, one finds evidence of many additions, while a number of articles have been re-written. Further text illustrations and coloured plates add to the value of the work. The book contains some twenty-six more pages and the price has been reduced

by three shillings. Dr. Poulton is to be congratulated on his revision of this standard English text.

Manual of the Diseases of the Eye. Charles H. May, M.D. Thirteenth edition, revised. 461 pages, illustrated. Price $4.00 net. William Wood & Co., New York, 1930.

Since 1900 this remarkable little work has appeared in thirteen American editions, with sixteen reprints; six British editions with nine reprints; eight editions in Spanish, five in Italian, French, and Dutch; two in German, and even two editions in both Japanese and Chinese. In thirty years there has appeared a total of forty-eight editions with forty reprints—a veritable "best seller" in the realm of medical literature. These statistics are sufficient testimony to the popularity and worth of Dr. Hay's Manual. It is by far the best of its kind.

In this latest edition the author has been more than ever successful in his effort to produce a practical concise handbook, without slighting any of the important conditions in the large field of ophthalmology. It also contains a very large number of illustrations, and very excellent coloured plates in great profusion for so small a book. A new section has been added on the use of the slit lamp and the corneal microscope.

For many years we have consistently recommended this manual to our students and practitioners.

Text-book of Hygiene. J. R. Currie, M.A., M.D., D.P.H., M.R.C.P. Professor of Public Health in the University of Glasgow, etc. 844 pages, 110 illustrations. Price $8.00. E. & S. Livingstone, Edinburgh, 1930.

The subject of hygiene has become so vast that it is a different matter to present it adequately in a single volume. Professor Currie has nevertheless succeeded in producing a work of unusual excellence.

Air, and the forces at work in ventilation, methods of artificial ventilation, warming, lighting, and smoke prevention are comprehensively dealt with. It is noticeable that in both England and Scotland, chimneys in private houses are not yet included among those which may be regulated. The importance of a smoke-free atmosphere and the beneficial effects of sunlight might perhaps have been a little more stressed.

The various types of water supply are described, together with the characteristics of good water. Chemical and bacteriological standards and methods of purification are discussed. Swimming baths are included in this chapter. The section on water-borne diseases is very good. There is apparently no law in England and Scotland dealing with cross or double connections. This is a matter which has received some attention in Canada and the United States and has been recognized as a possible means of disseminating water-borne diseases.

The chapter which deals with refuse and sewage disposal is much condensed. The methods in use in the British Isles are stressed here. Some of these possibly might not apply in this country owing to local conditions. The section on public health administration sets forth in a clear manner the machinery provided for administration of health laws in both England and Scotland. The duties and privileges of medical officers of health, sanitary inspectors, meat inspectors, health visitors and other officials are specified. We note that both medical officers of health and sanitary inspectors enjoy security of tenure of office.

A notable feature of public health work in England and Scotland is the importance attached to housing which is dealt with in the chapter on habitations, including hospitals and schools. Town-planning is an important subject for Canada and the provisions of the Scottish Act which are set forth might well be studied by our local governing bodies.

The long list of Acts and Regulations, quoted dealing with foods, drugs and milk, denotes the amount of work done in the way of securing clean and safe food and milk. The chapter on foods treats also of milk-borne diseases. Food preservation is given very fully. An article on food poisoning and food infection is included.

Infectious diseases and epidemiology, with historical data and modern methods of control, form an interesting part of the book. Such subjects as immunity, supersensitiveness, disinfection, and disinfestation are referred to here. Laws regulating communicable disease in England and Scotland which are given are numerous and specific. Professor Currie includes rheumatism among specific infections and recommends procedures for its control.

The Rats and Mice Destruction Act is a useful act which other countries might well copy.

The chapter on helminthes, insects, and arachnida is unusually complete. Such diseases as beri-beri, cancer, ergotism, pellagra, goitre, rickets, and scurvy are dealt with as a group; also social hygiene and industrial hygiene, including diseases caused by poison and dust, industrial lighting, and ventilation.

The volume includes a chapter on meteorology and climatology, subjects which are not usually dealt with in modern text-books of hygiene.

The seventy-five pages devoted to vital statistics and statistical methods indicate the importance of accurate statistics in the present day public health work. They cover the subject from a practical point of view, but we would like to have seen some space devoted to the necessity for and benefits to be derived from rates on morbidity, mortality and similar data. Students are apt to consider statistics a subject to be glossed over. Modern public health administration demands the use of accurate statistics in order to learn if public moneys are being expended to the best advantage. The question of statistical data and the calculation of various rates regarding population, births, marriages, and deaths are discussed in the first part of the section, numerous examples being presented in concise yet clear form. The second part of the section deals with statistical methods and will be of value to those engaged in studies which require an analysis of masses of numerical data.

Professor Currie's text-book will be of great value to students, candidates for the Diploma of Public Health, and professional health workers.

The Medical Annual. A Year Book of Treatment and Practitioner's Index. Forty-eighth year, 1930. 8vo., 920 pages, 61 plates and 130 illustrations. Bristol, John Wright & Sons; Toronto, The Macmillan Co. of Canada. Price $6.00.

The Medical Annual for 1930 appears as the forty-eighth number. A tribute is paid to Dr. Percy Roberts Wilde, its founder and first editor, who died last year. The present editors are Carey F. Coombs and A. Rendle Short. The contributors, as usual, are outstanding men in the subjects assigned to them. There is an excellent survey of the recent literature in medicine and surgery with special reference to practice. It will serve the practitioner well both as a book with which to keep in touch with medical progress and recent medical thought, and as a work as reference. This is indicated by its title "A Year Book of Treatment and Practitioner's Index". In the second part appears reference to new pharmaceutical preparations, new medical surgical instruments and appliances, and a list of the principal medical works and new editions published in English during 1929.